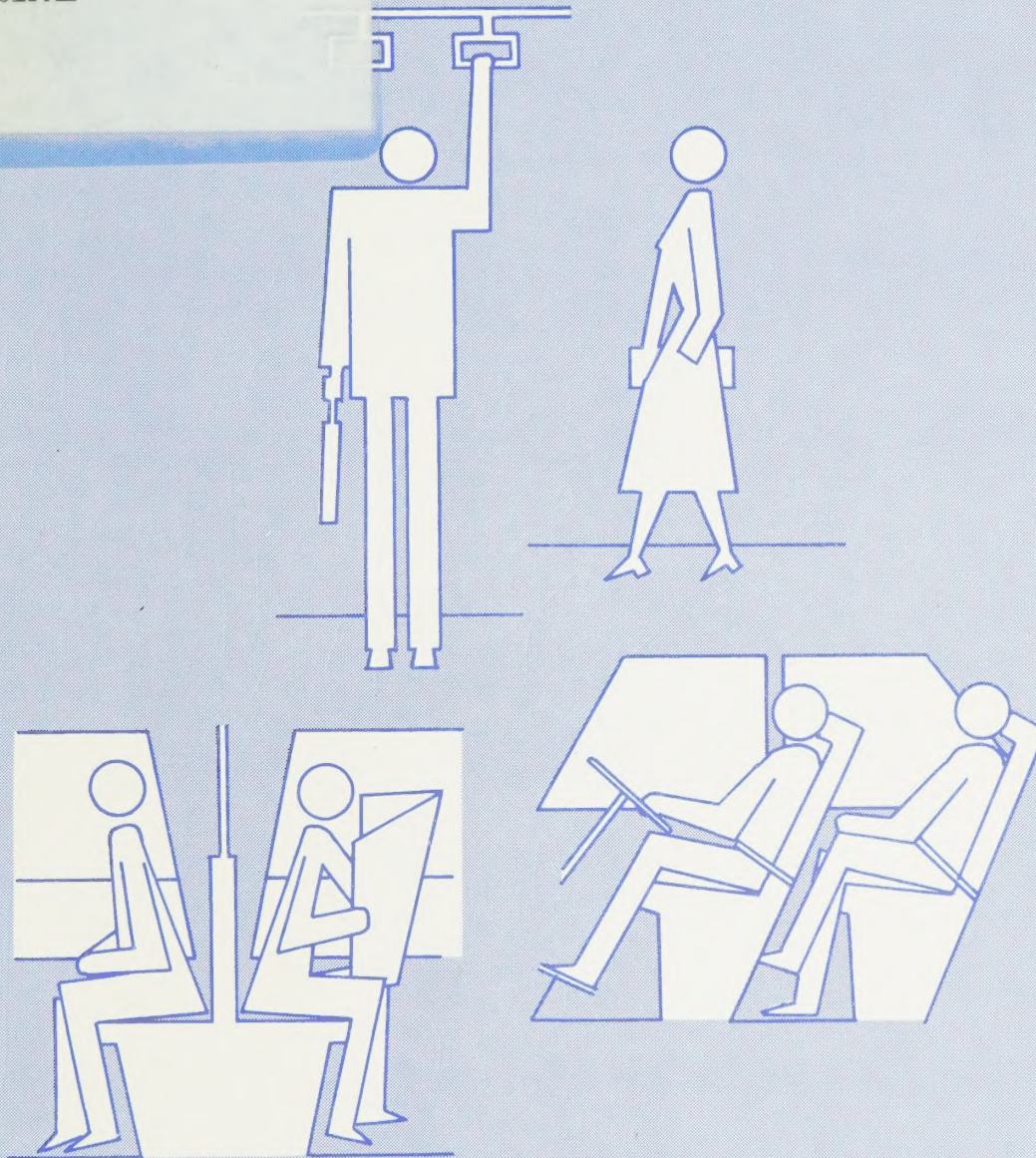


CA3 ON HW Q60
83 E57

EMPLOYEE TRAVEL SURVEY

URBAN/MUNICIPAL



VOLUME 2 ANALYSIS AND CONCLUSIONS

Hamilton-Wentworth
Planning and Development
Department

Nov. 1983

URBAN MUNICIPAL

DEC 12 1990

GOVERNMENT DOCUMENTS

EMPLOYEE TRAVEL SURVEY

VOLUME 2 ANALYSIS AND CONCLUSIONS

**PLANNING AND DEVELOPMENT DEPARTMENT
THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
NOVEMBER 1983**



Digitized by the Internet Archive
in 2023 with funding from
Hamilton Public Library

<https://archive.org/details/employeetravelsu00unse>

SUMMARY

The Employee Travel Survey provides information on the travel habits and travel patterns of persons working in the many firms and industries in the Hamilton-Wentworth Region. The information from the survey is used to analyze existing and future improvements required to transportation facilities and services provided by Municipal, Regional and Provincial governments.

The survey was conducted and analyzed by Hamilton-Wentworth staff under a funding agreement with the Provincial Ministry of Transportation and Communications. This survey is one of a number of travel characteristics surveys conducted by the Regional Municipalities in southern Ontario to provide a comprehensive data base on travel habits and travel patterns. This survey is unique in Hamilton-Wentworth since it is the first time that travel data was collected from employees at their place of work.

Questionnaires were distributed to a stratified sample of employees at their place of employment. The sample represents employees of selected firms in representative geographic areas. The final survey sample contains over 14,000 completed questionnaires representing approximately seven percent (7%) of all persons employed in Hamilton-Wentworth.

The returned questionnaires were edited and analyzed to determine the travel characteristics and travel patterns. The output of the survey analysis was examined to identify the potential of establishing or revising Regional policies to reduce congestion and improve service on the road and transit systems.

The major findings of the survey analysis follow:

1. Peak demands on the transportation systems coincide with the average starting and finishing times at places of employment. In downtown Hamilton, the peaks occur at 8:00 to 9:00 a.m. and 4:30 to 5:30 p.m. and travel is sharply peaked. In the Bayfront Industrial area, the peaks are at 6:30 to 7:30 a.m. and 3:30 to 4:30 p.m. with secondary peaks occurring around the 11:00 p.m. shift change.
2. The average travel time to work has increased substantially since the last comprehensive travel survey was done in 1974, with the average travel time to work now measuring 23 minutes. This increase in travel time reflects the continued development of suburban areas and an increase in commuting from places of residence outside the Region.
3. The use of the private automobile for work travel has increased in importance since 1974 despite substantial increases in the price of fuel. Since the last survey, the percentage of people who drive their own car to work has increased, the percentage of people who travel as auto passengers has decreased and the percentage of people who ride transit has remained unchanged.

4. The majority (75%) of people who travel to work on transit can be classified as captive riders since they do not have the option of travelling by auto. Of the 25% who choose transit over private auto, half do so because of cost and half do so because of convenience.
5. Over fifty percent (50%) of the people who travel to work in private autos can be classified as captive auto riders and would not choose to use transit if it were available. Of those who choose to use autos over transit, the majority do so because they find auto use faster and more convenient than transit.
6. Average car ownership for families of employees who travel to work by auto is significantly higher than for families of employees who use transit. Any changes in transit service to attract auto users must be in place for a long enough time to influence auto ownership decisions.
7. The rate of transit usage by employees in downtown Hamilton is significantly higher than in any other employment area. Although the Bayfront Industrial area has more employees than the downtown, the rate of transit usage there is less than one third of the rate in the downtown area. There is a significant potential to attract additional transit ridership by improving transit service to the Bayfront area.
8. A large number of people who are employed in Hamilton-Wentworth commute from residential areas in other regions. This is especially true of Burlington residents who commute to downtown Hamilton and the Bayfront Industrial area.

The information from the Employee Travel Survey was used to evaluate a number of transportation policy areas. The major conclusions follow:

- o The Urban Transit Service Area, in which transit services is funded on the basis of equalized assessment, should be reviewed with the objective of better reflecting work trip patterns.
- o The orientation of transit routes should be revised with the objective of increasing direct accessibility to all major employment areas. There appears to be significant potential for improving accessibility to the Bayfront Industrial area.
- o The proposed GO ALRT system to extend GO Rail service into Hamilton, should be implemented in a manner that best accommodates travel to places of employment in downtown Hamilton.
- o Express transit service from both downtown Hamilton and the Bayfront Industrial area to suburban residential areas has the potential of attracting a large number of commuters who now use autos.

- o Flexible work hours programs have a limited potential to reduce peak hour traffic into downtown Hamilton. The Region should encourage larger firms in the downtown to promote flexible work hour programs. The potential impact of flexible work hours in the Bayfront area is limited because of the prevalence of shift operations at large plants.
- o Car and van pooling programs have a limited potential to reduce traffic congestion in the Bayfront Industrial area and efforts to promote such programs should be continued.
- o A system of bicycle paths cannot be justified solely on the basis of work travel. However, if a bicycle path system were to be implemented for recreational or other purposes, efforts should be made to provide connections to downtown Hamilton and the major shopping centres and educational institutions.

More detailed analyses of the survey data has been used as input into the on-going studies of the GO ALRT connection to Hamilton and the Hamilton Street Railway transit systems studies. The survey data will be used as input into the analysis of specific transit, traffic or parking studies and can also be used to assess traffic impacts of future industrial, commercial or institutional development.

TABLE OF CONTENTS

<u>CHAPTER</u>	<u>CONTENTS</u>	<u>PAGE</u>
	SUMMARY	i
	TABLE OF CONTENTS	iv
	LIST OF EXHIBITS	vi
	LIST OF TABLES	vii
	LIST OF APPENDICES	viii
1.0	INTRODUCTION	1
2.0	SURVEY PROCESS	3
2.1	Survey Sampling Techniques	3
2.2	Conducting the Survey	3
3.0	DATA PREPARATION	7
3.1	Creation of Data Banks	7
3.2	Factoring Methodology	7
3.3	Production of Tabulations	12
3.4	Census Validity Checks	12
4.0	SURVEY RESULTS	15
4.1	Travel Characteristics	15
4.1.1	Time of Travel	15
4.1.2	Length of Trip	21
4.1.3	Mode of Travel	25

4.2	Factors Related to Mode of Travel	29
4.2.1	Drive Mode Choice Reasons	29
4.2.2	Transit Mode Choice Reasons	31
4.2.3	Mode Choice by Sex of Employee	33
4.2.4	Mode Choice by Vehicle Availability	33
4.2.5	Mode Choice by Walk Time to Transit Service	36
4.2.6	Mode Choice by Trip Length	37
4.2.7	Type of Parking Facility Used	38
4.2.8	Summary of Factors Related to Mode Choice	40
4.3	Travel Patterns	41
4.3.1	Total Person Travel Patterns	41
4.3.2	Transit Person Travel Patterns	45
4.3.3	Modal Split Patterns	46
4.4	Comments and Suggestions	48
5.0	POLICY OPTIONS AND DIRECTIONS	51
5.1	Transit Coverage	52
5.2	Transit Orientation	52
5.3	Inter-city Transit Services	53
5.4	Express Transit and Transit Ways	54
5.5	Flexible Work Hours	55
5.6	Ridesharing Programs	56
5.7	Bicycle Path Systems	58
5.8	Road System Improvements	59
5.9	Further Applications of Survey Data	60

LIST OF EXHIBITS

<u>EXHIBIT NO.</u>	<u>TITLE</u>	<u>PAGE</u>
2.1	Survey Process	4
2.2	Hamilton-Wentworth Survey Zones	5
3.1	Preliminary Data Preparation Process	9
3.2	Data Bank Format - Employee Questionnaire	9
3.3	Data Bank Format - Employer Interview	9
3.4	Factoring Methodology Process	10
4.1	Trip Time Distribution - Total Region	16
4.2	Trip Time Distribution - Downtown (Zone 18)	20
4.3	Trip Time Distribution - Bayfront (Zone 20)	20
4.4	Trip Length Frequency Distribution	22
4.5	Cumulative Trip Length Frequency	22
4.6	Travel Mode Choice	25
4.7	Travel Mode Choice by Employer Type	28
4.8	Travel Mode Choice by Employer Size	28
4.9	Total Person Travel Patterns - Bayfront	43
4.10	Total Person Travel Patterns - Downtown	44
4.11	Modal Split Values for Major Zone Categories	47

LIST OF TABLES

<u>TABLE NO.</u>	<u>TITLE</u>	<u>PAGE</u>
4.1	Work Depart Time - P.M. Peak Hour	18
4.2	Average Trip Length - 24 Hour Period	24
4.3	Travel Mode Choice - 24 Hour	27
4.4	Driver Mode Choice Reasons	30
4.5	Transit Mode Choice Reasons	32
4.6	Mode Choice by Sex of Employee	34
4.7	Mode Choice by Vehicle Availability	35
4.8	Mode Choice by Walk Time to Transit Service	36
4.9	Mode Choice by Trip Length	38
4.10	Type of Parking Facility Used	39
4.11	Comments and Suggestions	49

LIST OF APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>PAGE</u>
A	Cell Definitions	A-1
B	Survey Questionnaire	B-1
C	Employee Data Bank - Details of Codes and Contents	C-1
D	Origin - Destination Tables	D-1

1.0 INTRODUCTION

The Hamilton-Wentworth Planning and Development Department maintains a data base on traffic patterns and travel characteristics to be used in analyzing existing and future roadway and transit requirements. The most recent comprehensive information on travel characteristics was collected in 1974 and it was necessary to collect more current data to provide a better data base for analysis.

The purpose of the survey was to collect information on the work trip travel characteristics and travel patterns of persons employed within the Region of Hamilton-Wentworth.

This report is the second of a series of two which deal with the Employee Travel Survey. Volume 1 - Survey and Results - produced in June, 1981, outlines the purpose, sampling procedure, survey methodology and statistical validity of the sample. Volume 2 briefly reviews the methodology, and focuses on the data analysis and results. It describes data processing steps, factoring procedures, sample verification, production of tabulations, the resulting travel characteristics information, and the implications for specific policies or policy options.

2.0 SURVEY PROCESS

The basic steps involved in the Employee Travel Survey are summarized in the flow chart in Exhibit 2.1 and are briefly described below.

2.1 SURVEY SAMPLING TECHNIQUES

It was not feasible to survey the entire universe of employees in the Region. Therefore, a methodology was developed for selecting a sample representative of the total universe, as described in detail in Chapter 2 of the Volume 1 report.

Because there was not one comprehensive inventory of all employers in the Region, two separate listings were derived from a number of available sources; one for large firms with 20 or more employees, and one for small firms with fewer than 20 employees. These two categories of employers were surveyed and analyzed separately.

From each of the listings of firms, a representative sample of employers was selected. A stratified sampling technique was used to ensure a valid sampling of key subgroups according to geographic location, firm size and firm activity type, as described in Appendix A.

To make sampling as efficient as possible, 11 key zones (as shown in Exhibit 2.2) were selected for the sampling of large firms. These zones represent each of the major types of land use activity in Hamilton-Wentworth including urban, suburban, and rural zones, as well as the unique employment zones of Downtown Hamilton and the Bayfront industrial area. Small firms, on the other hand, were sampled randomly throughout all 30 zones in the Region.

All employees in the selected firms were surveyed, where possible. For some large firms, a sub-sample of employees in the firm was selected as explained in Section 2.4 of the Volume 1 report.

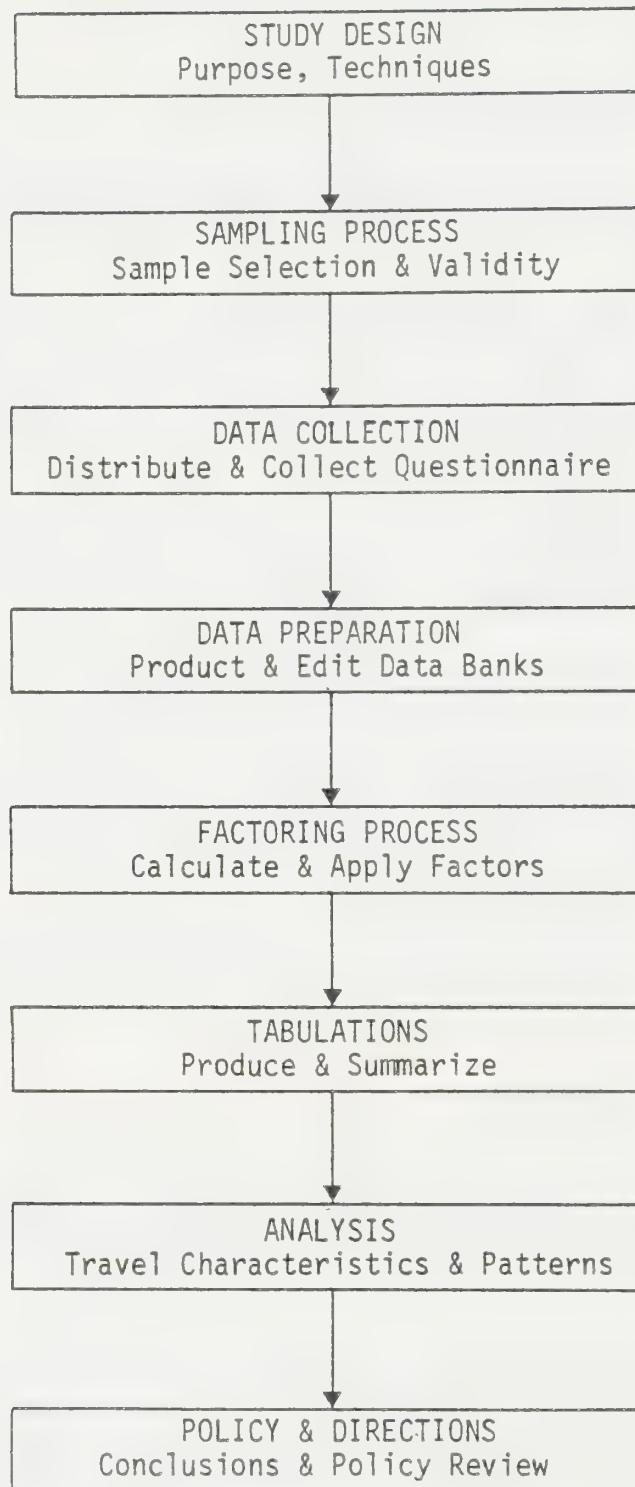
2.2 CONDUCTING THE SURVEY

The survey was conducted between September 1980 and January 1981. Information on personal travel behaviour was collected by means of a questionnaire, distributed to the selected employees at their place of work. A copy of this questionnaire is included as Appendix B.

Considerable preliminary publicity was carried out to ensure a good response to the survey. The purpose of the survey was explained to both employers and union officials. Employers were interviewed to obtain information on the nature of their operations and the numbers of people employed, and were asked to assist in the distribution and collection of questionnaires.

EXHIBIT 2.1

SURVEY PROCESS



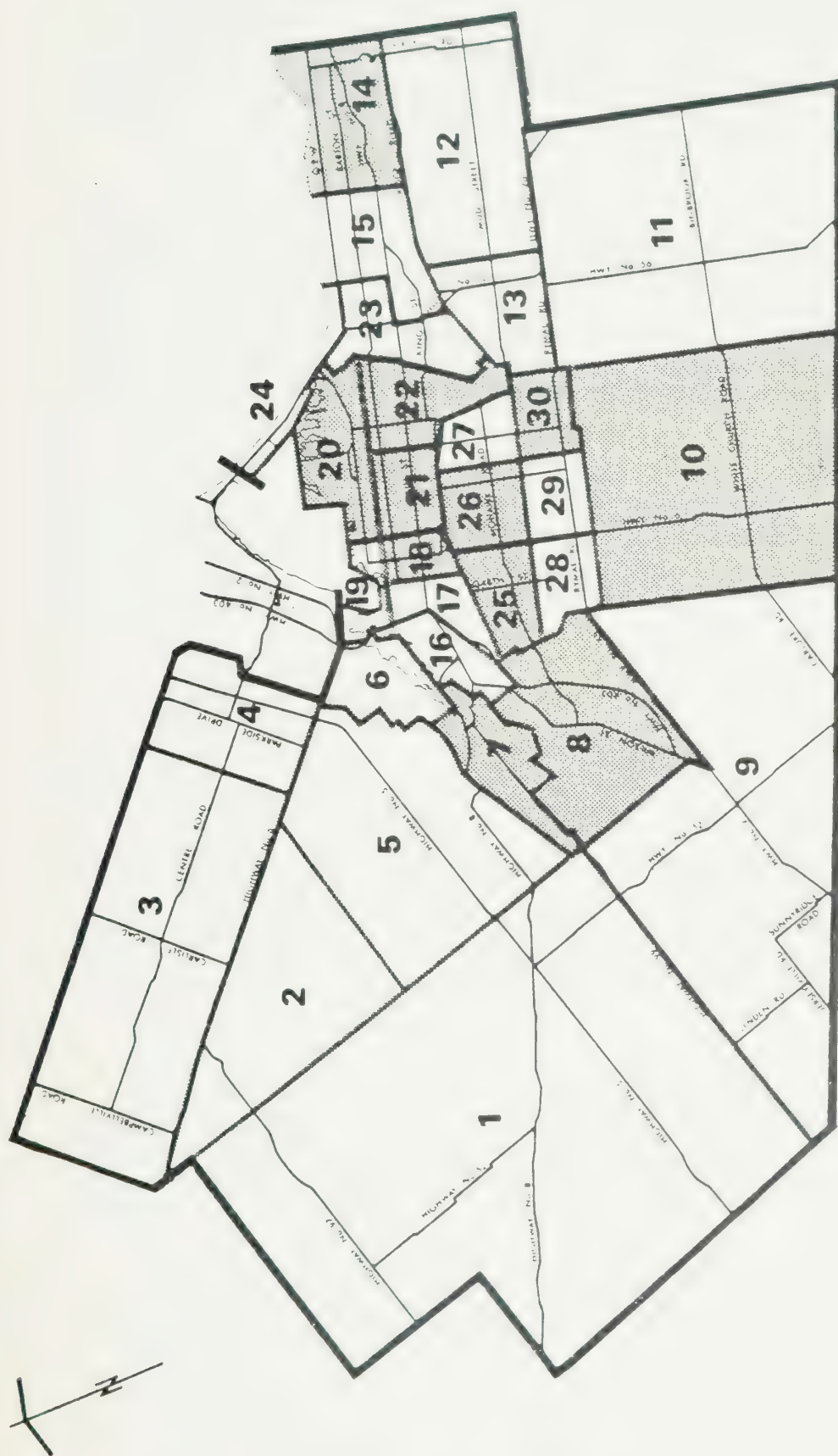


Exhibit 2.2

HAMILTON - WENTWORTH SURVEY ZONES

Planning and Development Department
Hamilton Wentworth Region

LEGEND

19 MACRO ZONE NUMBER

ZONES SURVEYED (For Large Firms)



A total of 31,476 questionnaires were distributed to employees in 332 firms (263 large firms and 69 small firms). There were 14,137 questionnaires completed and returned which represents approximately 7% of the number of employees* estimated to work in Hamilton-Wentworth.

Survey staff coded the responses, and completed preliminary editing. The responses were then keypunched to enable computer analysis. Statistical checks were conducted, as described in Volume 1 to ensure that the survey response was a statistically reliable sample of all employees.

* 1982 Employment Survey, Planning and Development Department, Regional Municipality of Hamilton-Wentworth, June, 1983.

3.0 DATA PREPARATION

The steps involved in the data preparation process are shown in Exhibit 3.1. The Ministry of Transportation and Communications computer facilities and programs were used in this process and in subsequent data analysis.

3.1 CREATION OF DATA BANKS

The survey data was used to build two data banks. Exhibit 3.2 illustrates the format and contents of the Employee Data Bank, based primarily on information from the employee questionnaire. Exhibit 3.3 illustrates the Employer Data Bank, created using information from the employer interview. These two data banks were edited and if key data on a record was invalid or missing and could not be corrected, that record was dropped from the sample.

Analyses focused on the Employee Data Bank. To facilitate this, certain key information such as employer size, type and geographic zones was transferred to the Employee Data Bank from the Employer Data Bank. The details on the contents of the Employee Data Bank, including definitions of each field and the numerical codes used to represent various responses, are found in Appendix C.

3.2 FACTORING METHODOLOGY

Since the survey did not sample all employees, all firms or all geographic areas, it was necessary to use various factors to expand the sample to represent the universe of all employees in the Region.

The large and small employer responses were factored separately, due to the different sampling techniques used for these two types of data. A number of separate factors were developed, as defined in the following sections, to address different aspects of the factoring process. The steps in the factoring process are summarized in Exhibit 3.4.

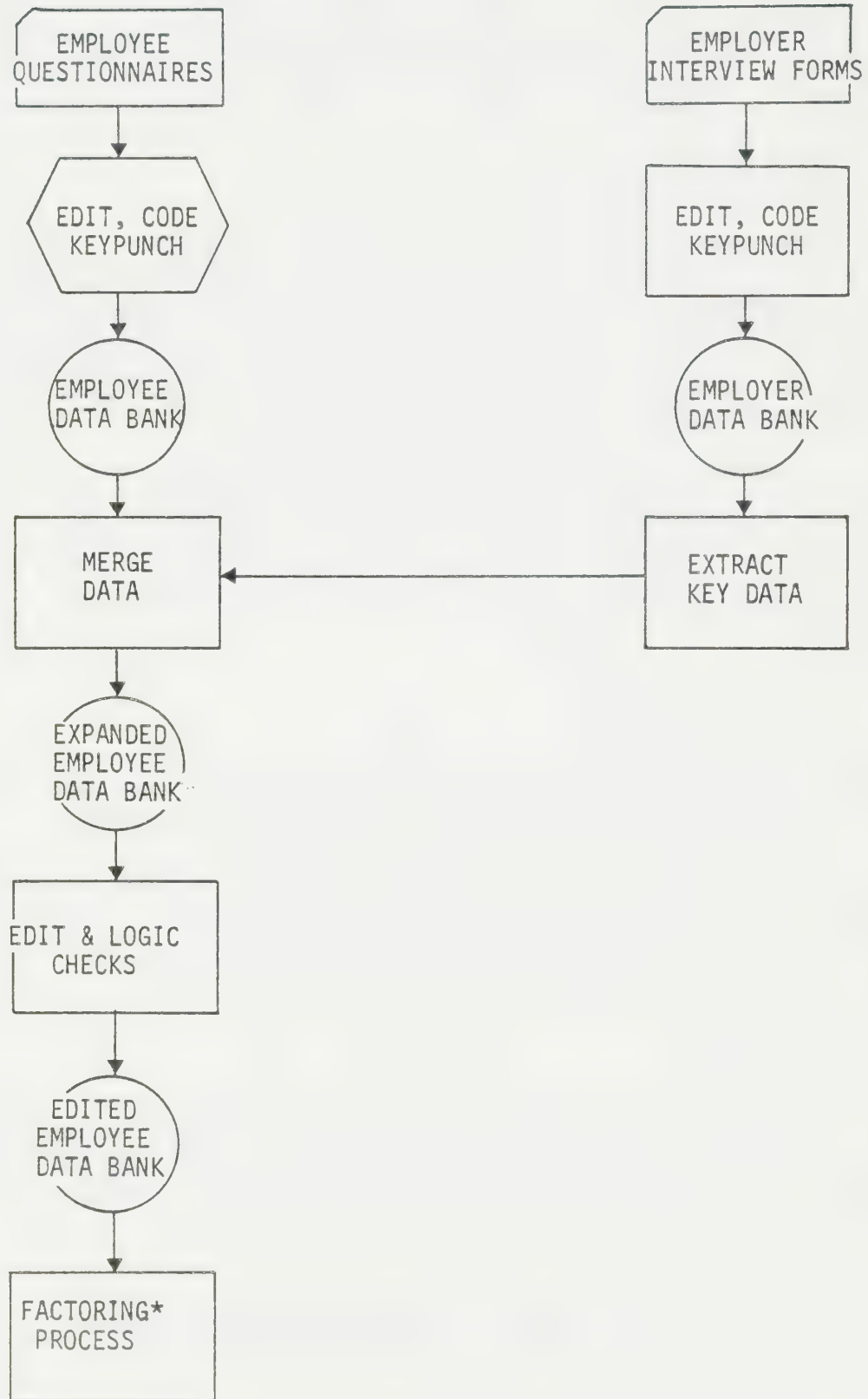
1. Firm Factor

This factor was used to expand the survey data to represent the total employees in each of the sampled firms. This was necessary both for those large firms where a partial sample of employees were requested to complete questionnaires, and in other firms, where the response rate was not one hundred percent.

$$\text{Firm Factor} = \frac{\text{Total employees in firm}}{\text{Employees in firm responding to survey}}$$

EXHIBIT 3.1

PRELIMINARY DATA PREPARATION PROCESS



* See Exhibit 3.4 - Factoring Process

Exhibit 3.2
DATA BANK FORMAT - EMPLOYEE QUESTIONNAIRE

FIELD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
CONTENTS	EMPLOYER NUMBER	EMPLOYEE / HOME MICRO ZONE	WORK ARRIVAL TIME (24 HR. CLOCK)	A.M. OR P.M. FOR WORK ARRIVAL TIME	DAY OF WEEK FOR WORK ARRIVAL TIME	WORK DEPARTURE TIME (24 HR. CLOCK)	A.M. OR P.M. FOR WORK DEPARTURE TIME	TRIP TIME TO WORK (MINUTES)	TRIP TIME FROM WORK (MINUTES)	TRAVEL MODE TO WORK - 1st FIELD	" " " " - 2nd FIELD	" " " " - 3rd FIELD	TRAVEL MODE FROM WORK - 1st FIELD	" " " " - 2nd FIELD	" " " " - 3rd FIELD	REASON FOR DRIVER MODE - 1st FIELD	" " " " - 2nd FIELD	" " " " - 3rd FIELD	" " " " - 4th FIELD	NUMBER OF OWNED VEHICLES	NUMBER OF LEASED VEHICLES	TYPE OF PARKING	REASON FOR NON DRIVER MODE - 1st FIELD	" " " " - 2nd FIELD	" " " " - 3rd FIELD	WALK TIME TO TRANSIT SERVICE	EMPLOYEE SEX	OCCUPATION	EMPLOYER SIZE CODE	EMPLOYER TYPE CODE	EMPLOYER / WORK MICRO ZONE
COL.	1 - 4	5 - 8	9 - 12	13	14	15 - 18	19	20 - 22	23 - 25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42 - 44	45	46	47	48	49 - 50

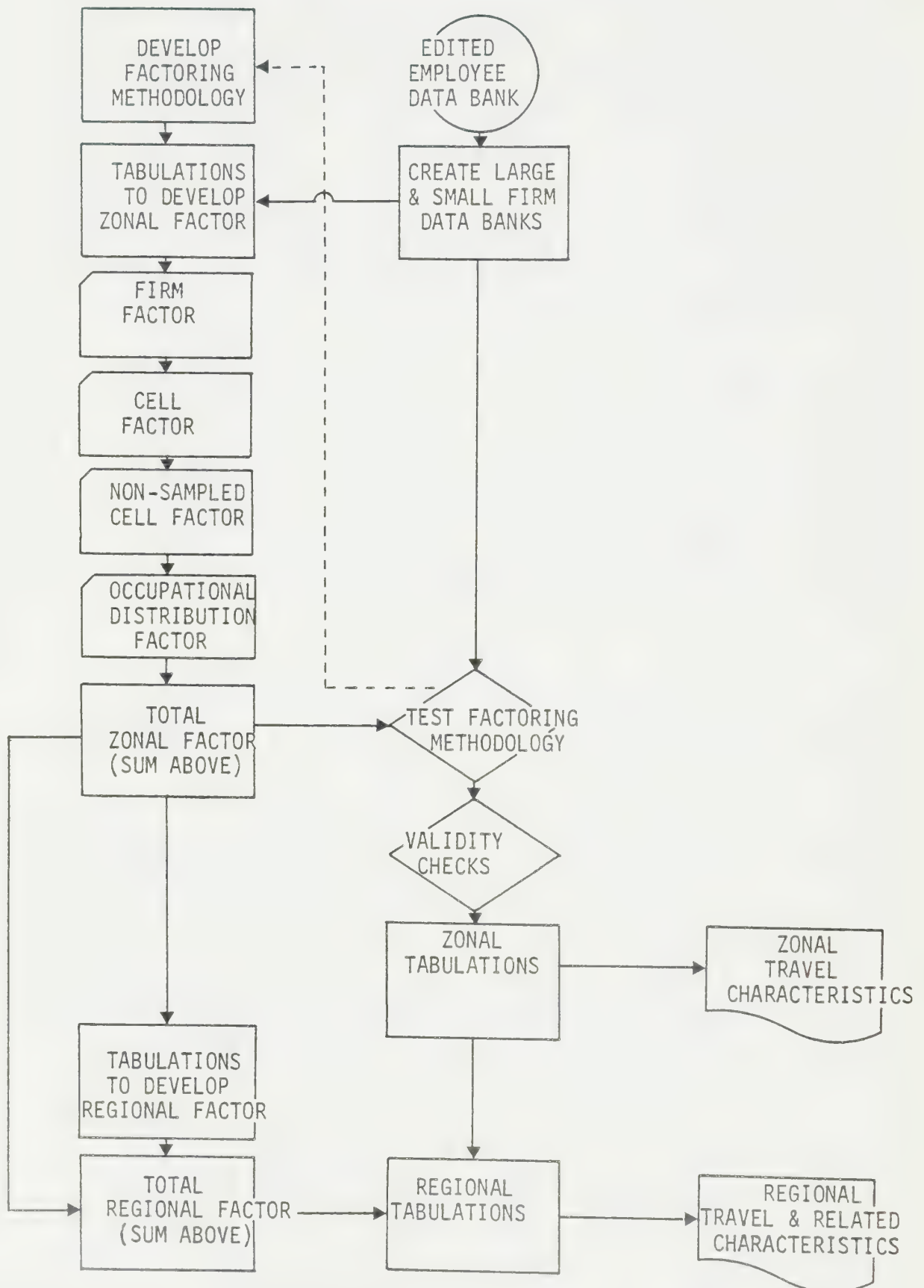
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	
EMPLOYEE / HOME MACRO ZONE	EMPLOYER / WORK MACRO ZONE	DRIVER OR NON - DRIVER CODE	TOTAL EMPLOYEES IN FIRM	SAMPLED EMPLOYEES IN FIRM	CELL NUMBER - ZONE / SIZE / TYPE	TOTAL EMPLOYERS IN CELL	SAMPLED EMPLOYERS IN CELL	FIRM FACTOR	CELL FACTOR	OCCUPATIONAL DISTRIBUTION FACTOR	NON - SAMPLED CELL FACTOR	FIRM FACTOR X CELL FACTOR	OCCUP DIST X N S CELL FACTOR	FIRM X CELL X OCCUP X N S C. FACTOR (1 Decimal)	P.M. PEAK HOUR FLAG	FIRM X CELL X OCCUP X N S C. FACTOR (No Decimal)	TOTAL FACTORS - SMALL FIRMS ONLY	REGIONAL FACTOR	TOTAL FACTOR (FLD 46 X REGIONAL)	
52 - 53	54 - 55	56 - 57	58 - 62	63 - 67	68 - 71	72 - 73	76 - 77	78 - 83	84 - 89	90 - 95	96 - 101	102 - 107	108 - 113	114 - 119	120	121 - 126	127 - 132	133 - 138	139 - 144	

Exhibit 3.3
DATA BANK FORMAT - EMPLOYER INTERVIEW

FIELD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONTENTS	EMPLOYER NUMBER	EMPLOYER TARIFFS ZONE	EMPLOYER TYPE CODE	NUMBER OF EMP. LOCATIONS	EMPLOYER SIZE CODE	% SAMPLE - PRELIMINARY ESTIMATE	TOTAL NUMBER OF EMPLOYEES	NUMBER OF CLERICAL EMPLOYEES	" " SALES	" " SERVICE	" " CONSTRUCTION EMPLOYEES	" " PRODUCTION	" " TRANSPORTATION	" " PROFESSIONAL	" " EXECUTIVE	" " OTHER	NUMBER OF MALE EMPLOYEES	" " FEMALE
COL.	1 - 4	5 - 8	9	10	11	12 - 13	14 - 18	19 - 21	22 - 24	25 - 27	28 - 30	31 - 35	36 - 38	39 - 42	43 - 45	46 - 48	49 - 53	54 - 57

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
NUMBER OF FULL TIME EMPLOYEES	" " PART TIME	FLEXIBLE WORK HOURS AVAILABLE	START TIME - PRODUCTION STAFF (Day Shift)	FINISH TIME - "	START TIME - OFFICE STAFF	FINISH TIME - "	START TIME - PRODUCTION (Afternoon)	FINISH TIME - "	START TIME - PRODUCTION (Evenings)	FINISH TIME - "	START TIME - OTHER / SPECIAL	FINISH TIME - "	LANGUAGE OTHER THAN ENGLISH VAN POOLING	NUMBER OF PARKING SPACES	WALK TIME FROM PARKING TO WORK	% ABSENTEEISM RATE	UNION OR NON UNION	
58 - 61	62 - 66	67	68 - 71	72 - 75	76 - 79	80 - 83	84 - 87	88 - 91	92 - 95	96 - 99	100 - 103	104 - 107	108	109	110 - 113	114 - 115	116 - 117	118

EXHIBIT 3.4
FACTORING METHODOLOGY PROCESS



Note: Factoring and tabulations completed separately for large and small firm data banks and results summed

2. Cell Factor

The survey data in each cell was next factored up to represent the total employees in that cell. It was assumed that within each cell, firms not sampled had similar characteristics to sampled firms, since a representative sample was obtained in each cell.

$$\text{Cell Factor} = \frac{\text{Total employers in cell}}{\text{Employers in cell participating in survey}}$$

3. Non-Sampled Cell Factor

Several cells were not sampled at all, since they contained very few or no firms. Since these unsampled cells could not be factored up using the cell factor described above, a non-sampled cell factor was calculated, based on average firm characteristics in sampled cells within the same geographic zone. This factor was then applied to the non-sampled cells which contained a small number of firms.

4. Occupational Distribution Factors

For several large firms there was concern that the physical method of distribution of the survey questionnaire had resulted in an over representation of certain occupational categories. To check this, the occupational distribution (percentage of employees in each occupational category) was calculated for each major firm. This was done using both the employee survey responses, and the information obtained from the employer interview. Where these two distributions were significantly different, factors were calculated to bring the employee survey response rates more into line with the employer data.

$$\begin{array}{lcl} \text{Occupational} & & \% \text{ Employees in occupation by firm} \\ \text{Distribution} & = & \text{(from employer data)} \\ \text{Factor} & & \frac{\% \text{ Employees in occupation by firm}}{\text{(from employee data)}} \end{array}$$

5. Zonal Factors

The above four factors were combined for each survey record to produce total zonal factors. Up to and including this point, factors were developed separately for large and small firm data. Therefore, factors were produced for each of the 11 zones for which large firms were sampled and for all zones within which small firms were sampled.

Test tabulations were run on the computer to check the accuracy of the overall zonal factors. The results were compared with firm and cell universe distributions contained in the Volume 1 report. The factored data was within one percent of the perceived universe in terms of total employees in each cell.

6. Regional Factors

The regional factor enables the translation of data on the 11 surveyed zones into a form representative of all zones in the Region. This is done on the basis of land use categories of zones as outlined in the sampling techniques.

Each of the factors were calculated separately and stored in separate fields of the Employee Data Bank, along with fields representing total factors. Therefore, further analysis could be carried out at any level of the factoring process, that is:

- for completely unfactored responses
- for responses factored up to represent each of the 11 surveyed zones
- for responses factored up to represent the entire Region, including all 30 zones

The total regional factors were applied for analysis of overall travel characteristics. The zonal factors were used for analyzing zonal travel characteristics or origin-destination patterns. Unfactored data was used only as a means of checking survey techniques.

3.3 PRODUCTION OF TABULATIONS

In order to analyze the results of the survey, computer tabulations were produced to summarize the data. Prior to survey analysis, a number of basic tabulations were run to ensure that the survey sample was comparable to other data sources, particularly the most recent Census data. The results of these census validity checks are contained in Section 3.4.

Tabulations were run to provide information on basic travel characteristics, such as travel mode, trip time and trip length, on a regional basis for both 24-hour and p.m. peak hour time periods. The results are outlined in Section 4.1 of this report.

Further tabulations were produced to determine how the basic travel characteristics were related to other factors, such as reasons for mode choice, parking type, auto availability, etc. These results are outlined in Section 4.2. Tabulations were also prepared to determine origin-destination patterns, as described in Section 4.3.

3.4 CENSUS VALIDITY CHECKS

The survey results were compared with the 1971 Census in terms of the distribution of demographic characteristics. These characteristics include the distribution of employees by firm type and by occupation as well as household auto ownership. Data from the 1976 Census was available for comparing the rate of response by sex. The results of the 1981 Census were not available for comparison.

Exact matching of the two data sources is not expected. The 1971 Census data was based on information collected at the place of residence, while the Employee Travel Survey data relates to the place of work. The survey data thus includes responses from people working inside the Region of Hamilton-Wentworth who live elsewhere, while the Census data includes only those who live in the Region, some of whom work outside the Region. There is also a difference of approximately ten years between the two data sources and thus, some changes can be expected. Therefore, the data from the two sources is checked for general compatibility rather than for exactness of fit.

The percentages of employees within four major categories of firm activity type were compared for the 1971 Census and the Employee Travel Survey. The firm type distributions are very similar. Employees in manufacturing, construction and wholesale firms represent the highest proportion in both cases, at approximately 43 - 44% of the total. Employees in service firms represent another major segment, at 38 - 41% of the total. The observed difference in the proportion of service employees between the two sources could be due to a combination of factors such as changes over time, and differences in the scope of data collection. Employees in retail firms represent approximately 16% of total employees in both cases. Primary activity employees, such as those involved in agricultural and extractive firms, represented 1.8% in the 1971 Census, but were not surveyed in the Employee Travel Survey.

The percentage distribution of employees by occupation was compared for the 1971 Census and the Employee Travel Survey. The two sources exhibit fairly similar distributions among occupational categories although there are some differences. Employees in production, professional, clerical and office, and service occupations, represent the highest proportions of employees in the Employee Survey, with over 15% in each category. These occupational categories are also of greatest importance within the 1971 Census, although the service and professional occupations are somewhat lower in relative importance.

Information on the male/female ratio of employees working in Hamilton-Wentworth from the 1976 Census was compared with the distribution for the Employee Travel Survey. The percentages of male and female employees are almost identical for the two sources, with approximately 62% male and 38% female employees.

The distribution of vehicles owned on a household basis was compared for both the 1971 Census and the Employee Travel Survey. There is a significant difference between the data from the two sources, with the more recent survey showing a significantly higher average vehicle ownership. In the 1971 Census, 77% of households owned one or more vehicles as compared with 92% for the Employee Travel Survey.

The differences can be explained by three factors. Firstly, the ten years between the two surveys involved advances in prosperity and vehicle ownership. Secondly, the Census figures included the entire population, whereas the more recent survey includes only the employed labour force which would tend to have a higher vehicle ownership. Thirdly, the Employee Survey question on vehicle ownership included all vehicles (cars, trucks and vans) owned or leased by the respondent's family, whereas the Census data includes only automobiles.



4.0 SURVEY RESULTS

Following the data preparation steps described in Chapter 3.0, the survey data was analyzed to develop an understanding of the travel characteristics of employees, the factors that influence travel characteristics, and the travel patterns that result in Hamilton-Wentworth.

Summaries for all travel characteristics and related factors were produced at the Regional level. Key characteristics and travel pattern information were summarized at the Zonal level. Most of the information presented in this report is representative of total daily work trips, occurring over a 24 hour period. Some additional summaries were produced for those work trips occurring during the p.m. peak hour period.

The results of the analysis are presented in this chapter under the following headings:

- Travel Characteristics,
- Factors Related to Mode of Travel,
- Travel Patterns, and
- Comments and Suggestions

Policy directions which are indicated by the analysis are provided in Chapter 5.0. Their purpose is to assist in improving the effectiveness of the transportation system for work-related travel.

4.1 TRAVEL CHARACTERISTICS

There are three important characteristics associated with each work trip which define the nature of travel. These are the time of day at which the trip was made, the length of the trip, and the travel mode used to make the trip (i.e. auto, transit, etc). The survey results for these three characteristics are outlined here in terms of the percentage of employees that travel at certain times, have certain trip lengths, and use certain modes.

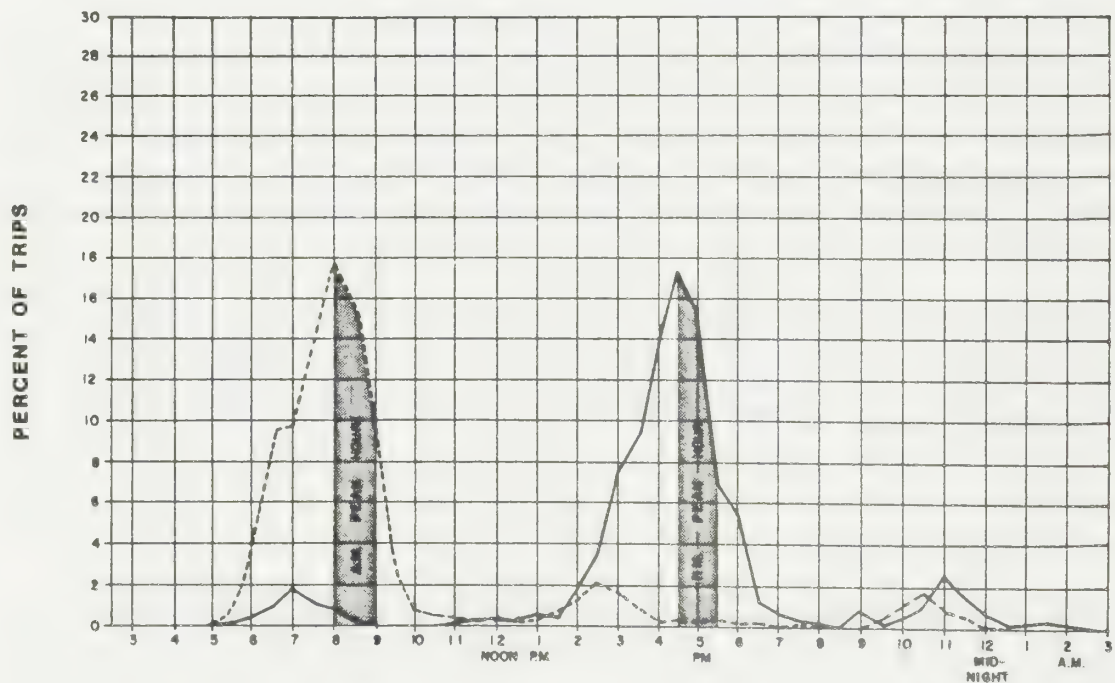
Information on the three major travel characteristics is presented for total employees in the Region. Information is also presented on variations within the Regional distribution, such as variations between geographic areas and occupational groups, and between firms of different types and sizes.

4.1.1 Time of Travel

Road and transit facilities must be designed to accommodate the peak loadings of trips which may be determined from the travel time distribution.

For the purpose of this analysis, the time of travel is defined as the time at which employees arrive at work, and depart from work, as determined from responses provided on the survey questionnaire. Exhibit 4.1 plots the percentage of employees in the Region arriving and departing from their place of employment for each half hour period during the day, starting at the times shown. The major characteristics of this total time distribution are summarized as follows:

- o The morning peak hour of travel occurs between 8:00 a.m. and 9:00 a.m., when over 30% of trips to work are made.
- o The evening peak hour occurs between 4:30 and 5.30 p.m., when over 30% of trips from work are made.
- o Broad shoulder areas occur around these peak hours within which most of the remaining trips occur. Over 50% of trips to work and from work occur in the 2 hour period surrounding and including each peak hour. Over 70% of trips occur in the 3 hour period around the peak hours.
- o Within these shoulder areas a higher percentage of trips are made before the actual peak hour than after it.
- o Several smaller peaks occur throughout the day, at 7:00 a.m., 3:00 p.m. and 11:00 p.m. Up to 2% of total trips occur in the half hour periods starting at these times.



LEGEND

- WORK ARRIVE TIME
- WORK DEPART TIME

Exhibit 4.1

TRIP TIME DISTRIBUTION
TOTAL REGION

Planning and Development Department
Hamilton-Wentworth Region

These characteristics of time distribution have been compared with those noted in past studies in Hamilton-Wentworth. The 1974 Home Interview Survey* indicated peak hours of 8:00 - 9:00 a.m. and 5:00 - 6:00 p.m. for work trips.

The overall time distribution is very similar for the results of the 1974 Home Interview Survey and the 1981 Employee Travel Survey in terms of the percentage of trips occurring in the peak hours, the broad shoulder areas and the small secondary peaks.

The Survey results were also compared with information on work trip starting and departure times for other southern Ontario municipalities such as Metropolitan Toronto, York and Durham. While the peak hours of travel are 8:00 - 9:00 a.m. and 4:30 - 5:30 p.m. in Hamilton-Wentworth, the peak hours occur slightly earlier in these other areas, at 7:00 - 8:00 a.m. and 4:00 - 5:00 p.m.** (based on data summarized by one hour periods). The magnitude of peaking in these municipalities was similar to that noted in Hamilton-Wentworth.

Table 4.1 indicates the average p.m. peak hour for trips from work, for employees in each occupation category, firm type category, firm size category and work zone. For each category, the percentage of total daily employees who depart from work during the p.m. peak hour is also included. The following major characteristics and variations are noted:

- o Employees in clerical and office, service and construction occupations; service type firms; small to medium size firms (under 300 employees) and employees working in most geographic areas have a p.m. peak hour between 4:30 and 5:30, the same as for the total of all employees in the Region.

* It should be noted, for the purposes of this and later analyses, that the results of the Employee Travel Survey and the 1974 Home Interview Survey are not directly comparable, due to differences in methodology. The 1974 Home Interview Survey deals with all trips made by people living Hamilton-Wentworth (regardless of whether they work here or elsewhere, or at all). By contrast, the Employee Travel Survey deals with the work trips of all employees working in Hamilton-Wentworth (regardless of whether they live here or elsewhere). The previous survey was designed to collect information on total personal travel (related to work, shopping, school, etc.). The more recent survey was designed to collect information on work-related travel only. Overall travel characteristics may be relatively similar for the two surveys, although the extent of incommuting to and outcommuting from Hamilton-Wentworth may be expected to cause some differences. Differences can also be expected because of the time lapse between the surveys. Comparisons are made to obtain a general idea of changes over time, but conclusions drawn from the comparison must take into consideration the differences in the data bases.

** Greater Toronto Area Inter-Regional Travel Characteristics, MTC Toronto Area Transportation Planning Data Collection Committee, September 1982, Figures 19 & 20.

TABLE 4.1

WORK DEPART TIME - P.M. PEAK HOUR

	<u>P.M. PEAK HOUR</u>	<u>% OF DAILY TRIPS</u>
REGIONAL AVERAGE	4:30 - 5:30 P.M.	33
<u>OCCUPATION</u>		
1. Clerical & Office	4:30 - 5:30	58
2. Sales	5:30 - 6:30	46
3. Service	4:30 - 5:30	25
4. Construction	4:30 - 5:30	32
5. Production	3:00 - 4:30	29
6. Transportation	3:30 - 4:30	31
7. Professional	4:00 - 5:00	42
8. Executive & Management	5:00 - 6:00	44
<u>FIRM TYPE</u>		
1. Manufacturing, Construction & Wholesale	4:00 - 5:00	34
2. Retail	5:00 - 6:00	47
3. Service	4:30 - 5:30	38
<u>FIRM SIZE</u>		
1. 1 - 19 employees	4:30 - 5:30	45
2. 20 - 99	4:00 - 5:00	37
3. 100 - 299	4:30 - 5:30	40
4. 300 - 499	4:00 - 5:00	29
5. 500+	4:00 - 5:00	32
<u>WORK ZONE*</u>		
Zone 7 Urban Dundas	4:30 - 5:30	49
Zone 8 Urban Ancaster	4:00 - 5:00	72
Zone 10 West Glanbrook	4:30 - 5:30	44
Zone 14 S.E. Stoney Creek	4:30 - 5:30	44
Zone 18 Downtown Hamilton	4:30 - 5:30	45
Zone 20 Hamilton Bayfront	3:30 - 4:30	32
Zone 21 Central Hamilton	4:30 - 5:30	40
Zone 22 East-Central Hamilton	4:30 - 5:30	25
Zone 25 N.W. Hamilton Mtn.	4:00 - 5:00	38
Zone 26 North Hamilton Mtn.	5:00 - 6:00	37
Zone 30 S.E. Hamilton Mtn.	5:00 - 6:00	56

* See Exhibit 2.1, Hamilton-Wentworth Survey Zones Map

- o Employees in production occupations, manufacturing type firms, large firms, and the Bayfront Industrial Area have an earlier peak hour, occurring between 3:00 and 4:00.
- o Employees in sales and executive occupations, retail type firms, and suburban zones have a later peak hour, occurring between 5:00 and 6:00 p.m.

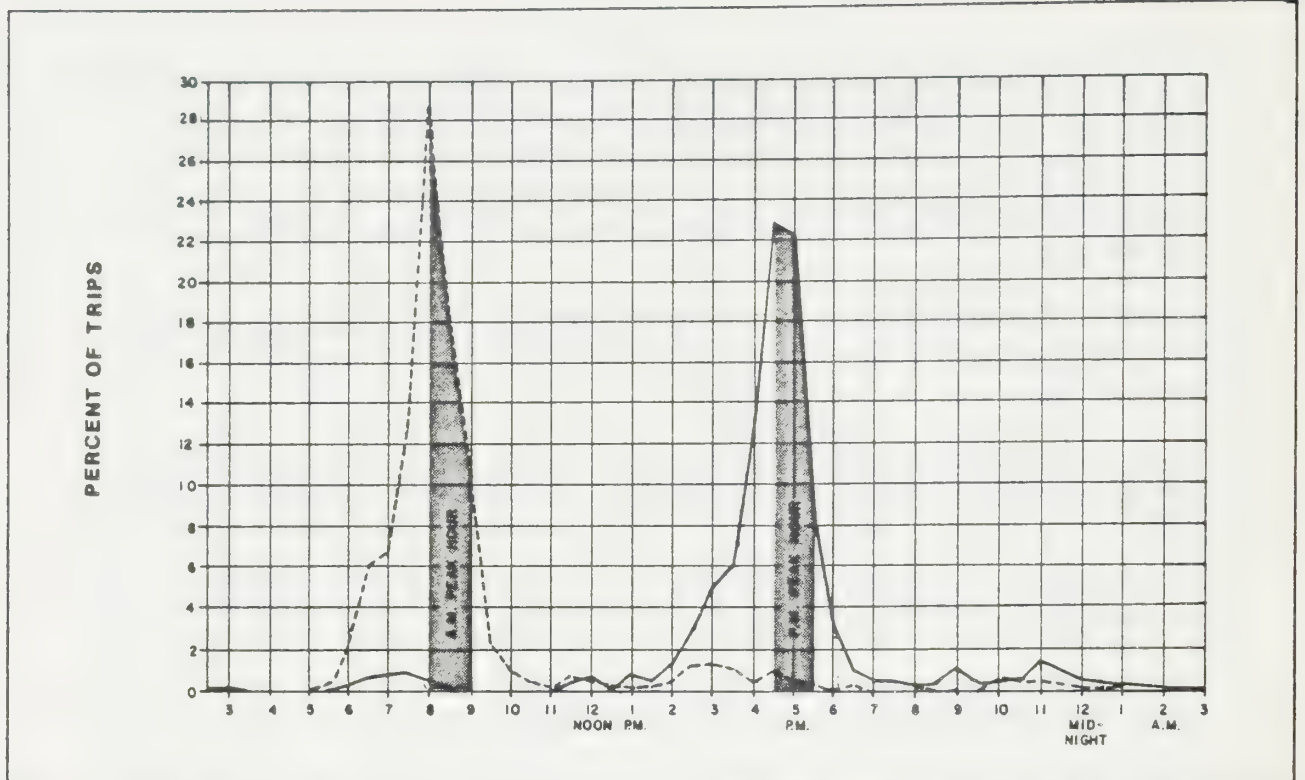
The travel time distributions for Downtown Hamilton and the Bayfront Industrial Area are shown separately, in Exhibits 4.2 and 4.3 respectively.

For Downtown Hamilton, the travel time pattern illustrated in Exhibit 4.2 may be described, and compared with that for the overall Region, as follows:

- o The peak hours occur at 8:00 - 9:00 a.m. and 4:30 - 5:30 p.m., the same as for the overall Region.
- o Travel is considerably more peaked, with over 45% of total trips to and from work occurring in the peak hours.
- o Almost all trips occur in the vicinity of the peak hours, with approximately 70% of trips to and from work occurring in the 2 hour period surrounding the peak hours, and 80% of trips occurring in the related 3 hour period.
- o Of these trips in the vicinity of the peak hours, a slightly higher proportion occur before the peak hours than after them.
- o No secondary peaks are evident, although there are small numbers of employees arriving and leaving work throughout the day.

For the Bayfront Industrial Area, the trip time distribution illustrated in Exhibit 4.3, shows the following characteristics:

- o The peak hours occur at 6:30 - 7:30 a.m. and 3:30 - 4:30 p.m.
- o Over 30% of total trips to and from work occur in the peak hours, which is similar to the Regional average.
- o Approximately 60% of trips occur in the 2 hour periods surrounding the peak hours, and 70% occur in the related 3 hour periods.
- o Relatively equal proportions of trips occur just prior to and just following the peak hours.
- o Major secondary peaks for trips to work occur during the half hour periods starting at 2:30 p.m. and 10:30 p.m., each representing up to 4% of total daily work trips. Secondary peaks of similar magnitude occur for employees leaving work during the half hour periods starting at 7:00 a.m. and 11:30 p.m.



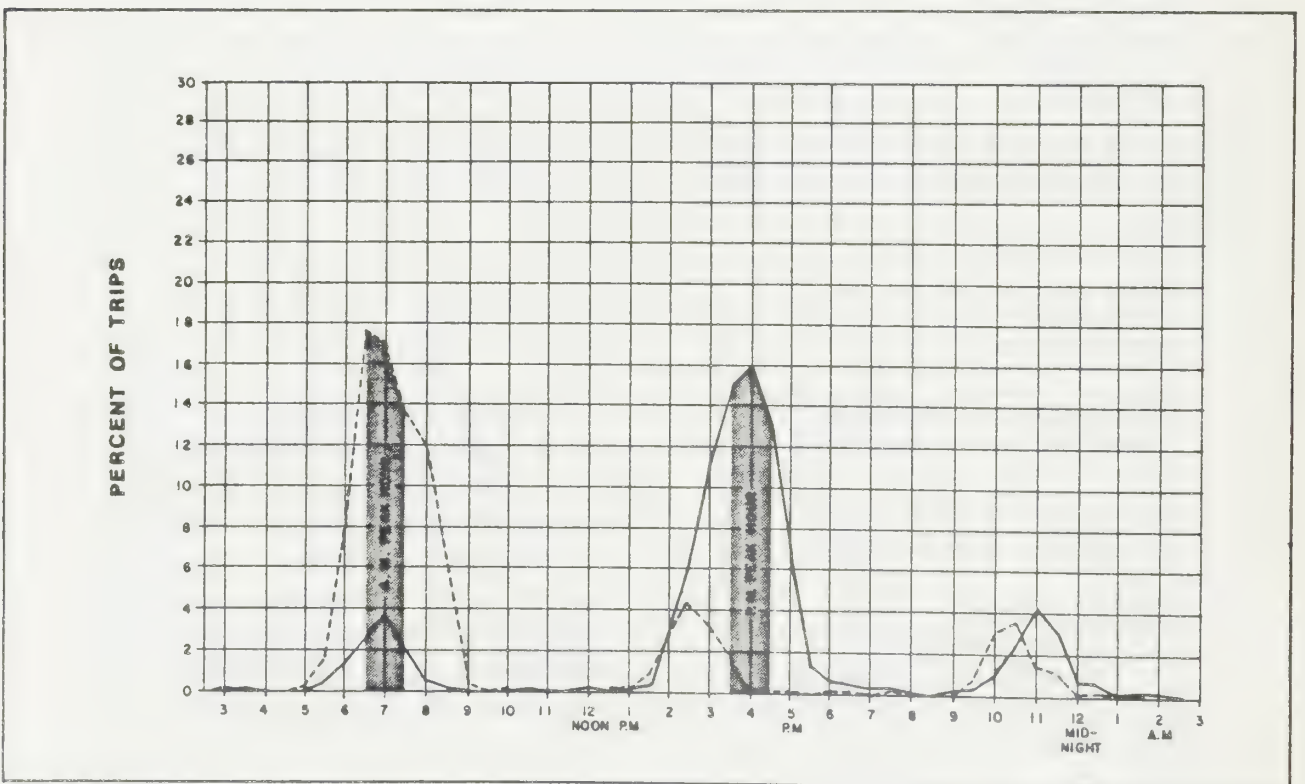
LEGEND

- WORK ARRIVE TIME
- WORK DEPART TIME

Exhibit 4.2

**TRIP TIME DISTRIBUTION
DOWNTOWN (ZONE 18)**

Planning and Development Department
Hamilton-Wentworth Region



LEGEND

- WORK ARRIVE TIME
- WORK DEPART TIME

Exhibit 4.3

**TRIP TIME DISTRIBUTION
BAYFRONT (ZONE 20)**

Planning and Development Department
Hamilton-Wentworth Region

Conclusions - Time of Travel

The following general conclusions can be drawn from the observations on the time of travel for work trips:

- o The a.m. peak hour occurs at 8:00 - 9:00 a.m. and the p.m. peak hour at 4:30 - 5:30 p.m., reflecting the importance of the 9:00 a.m. to 5:00 p.m. working day associated with most employees in the Region.
- o Shift workers, such as production employees in manufacturing plants, who work from approximately 7:00 a.m. to 3:00 p.m., have major impacts on travel time distribution. They account for the high proportion of trips preceeding the actual peak hours within the overall Regional distribution and also account for the earlier peak hours associated with the Bayfront Area.
- o Variations by geographic area, firm type and firm size are related primarily to employee occupation. Earlier than average time of travel is associated with production, construction and transportation employees. Later than average time of travel is associated with sales and executive employees.
- o Work areas with a high proportion of employees in educational institutions also have earlier than average p.m. peak hours.

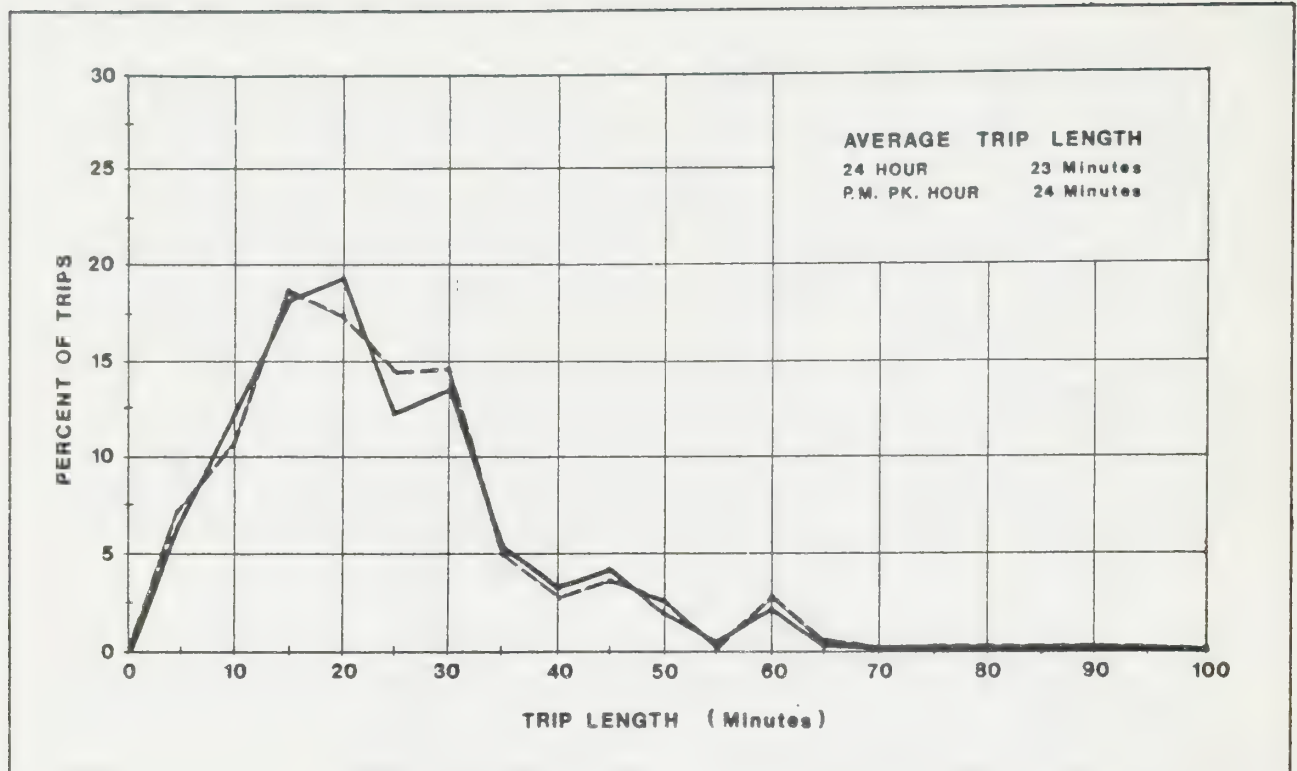
4.1.2 Length of Trip

For the purposes of this survey, trip length is measured as the length of time that people spend travelling to and from work. This information is derived from questionnaire responses concerning travel time. Therefore, it is a subjective estimate of travel time, as perceived by employees, rather than an actual measure.

Exhibit 4.4 plots the percentage of employees with trip lengths from work in each 5 minute interval between 5 and 100 minutes. The trip length distributions are plotted separately for all trips made over the 24 hour period (total daily) and for trips made in the p.m. peak hour. It may be noted that:

- o The daily average work trip length is 23 minutes.
- o The p.m. peak hour average trip length is 24 minutes.
- o Over 70% of daily trips are between 10 and 30 minutes in length.
- o Approximately 90% of daily trips are less than 40 minutes in length.

This current trip length data has been compared with data from past studies, and with surrounding urban areas. Exhibit 4.5 compares the cumulative work trip length frequency for the Employee Travel Survey, and the 1974 Home Interview Survey. This illustrates that trip length has increased since the 1974 survey, with a higher percentage of longer trips occurring in the 1980 survey.



LEGEND

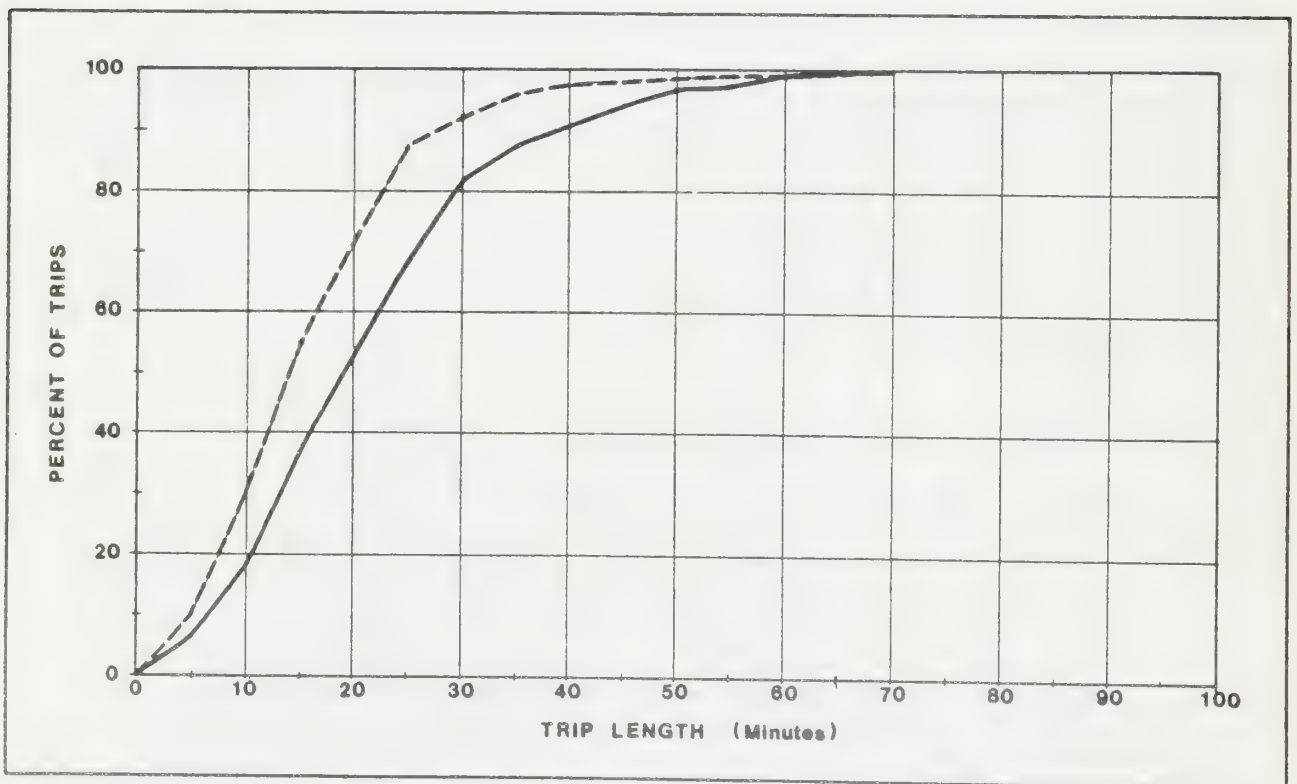
— 24 HOUR
 - - - P.M. PK. HOUR

NOTE: DISTRIBUTION BY 5 MINUTE INTERVALS

Exhibit 4.4

TRIP LENGTH FREQUENCY DISTRIBUTION
 TRIP TIME FROM WORK (24 HOUR & P.M. PK. HOUR)

Planning and Development Department
 Hamilton-Wentworth Region



LEGEND

— 1980 EMPLOYEE SURVEY
 - - - 1974 HOME INTERVIEW SURVEY

NOTE: DISTRIBUTION FOR 5 MINUTE INTERVALS,
 FOR 24 HOUR PERIOD.

Exhibit 4.5

CUMULATIVE TRIP LENGTH FREQUENCY
 WORK TRIPS - 1980 AND 1974

Planning and Development Department
 Hamilton-Wentworth Region

The daily average trip length has increased from 15.5 minutes to 23 minutes. This increase may also be partly due to the fact that the 1974 survey included total persons living in Hamilton-Wentworth, while the 1980 survey also includes employees living outside of Hamilton-Wentworth who work here (as explained on Page 16).

Information related to other municipalities in the area indicates that work trip lengths are increasing in Metropolitan Toronto.* This increase may be attributed to the growth of suburban areas.

Table 4.2 illustrates the variations in average trip length by categories of occupation, firm type, firm size and geographic area. The following characteristics are noted:

- o Longer than average trip lengths are associated with construction and production occupations; manufacturing, construction and wholesale firms; firms with 500 or more employees; and the Bayfront Industrial Area.
- o Shorter than average trip lengths are associated with sales and executive occupations; service and retail firms; relatively small firms; and work locations in suburban areas.

Conclusions - Trip Length

The following concluding remarks may be made concerning trip length characteristics:

- o Average daily (24 hour) trip length is 23 minutes.
- o Average p.m. peak hour trip length is almost identical to the daily average.
- o Trip length has been increasing since 1974, in both Hamilton-Wentworth and adjacent urban areas.
- o Trips to major industrial work areas are longer than average.
- o Trips to suburban work areas are shorter than average.

*Greater Toronto Area Inter-Regional Travel Characteristics, MTC, September 1982, Page 31

TABLE 4.2

AVERAGE TRIP LENGTH - 24 HOUR PERIOD

REGIONAL AVERAGE 23 Minutes

OCCUPATION

1.	Clerical & Office	23
2.	Sales	20
3.	Service	23
4.	Construction	28
5.	Production	26
6.	Transportation	23
7.	Professional	22
8.	Executive & Management	21

FIRM TYPE

1.	Manufacturing, Construction & Wholesale	26
2.	Retail	22
3.	Service	20

FIRM SIZE

1.	1 - 19 employees	21
2.	20 - 99	21
3.	100 - 299	23
4.	300 - 499	23
5.	500+	25

WORK ZONE*

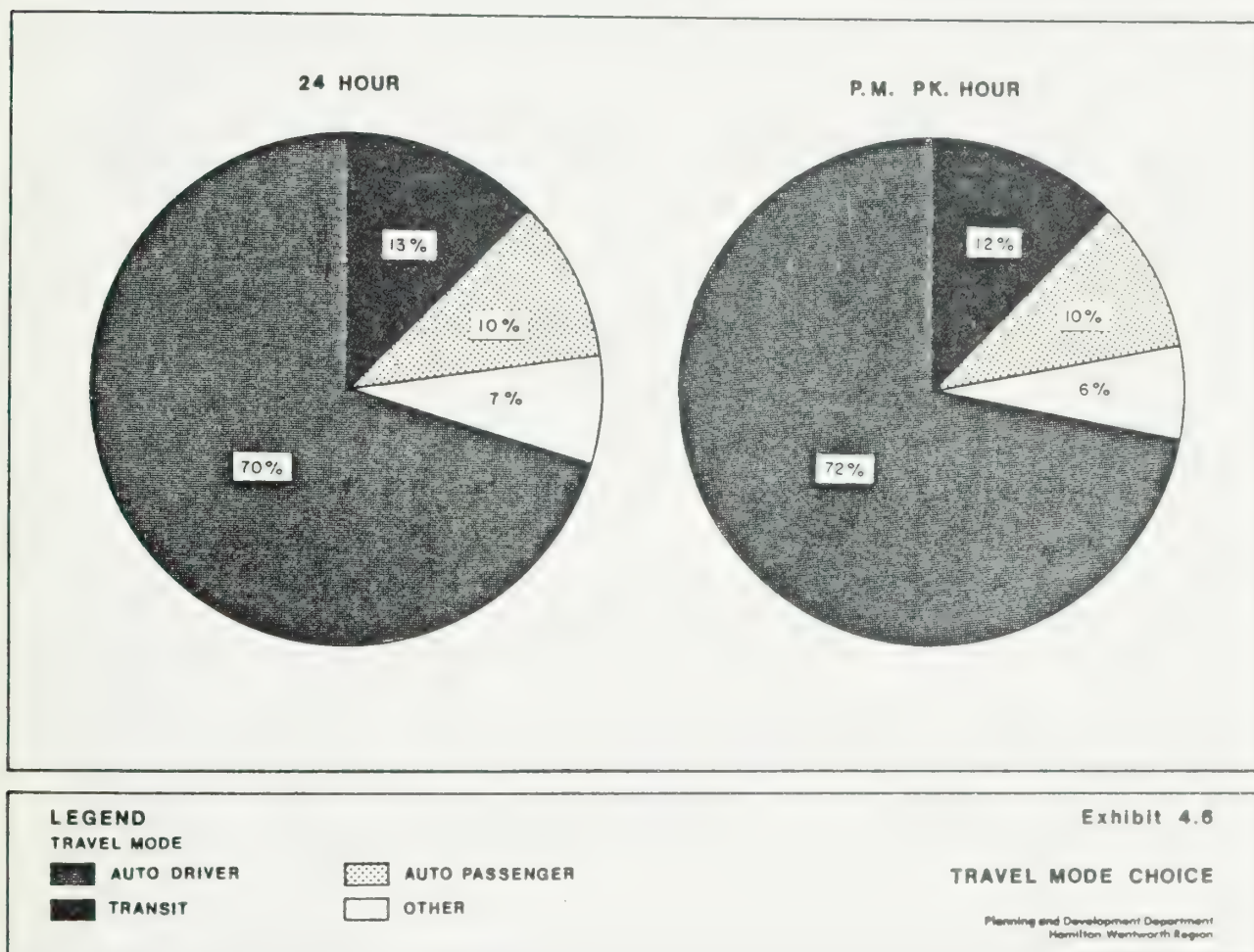
Zone 7	Urban Dundas	15
Zone 8	Urban Ancaster	19
Zone 10	West Glanbrook	23
Zone 14	South-east Stoney Creek	20
Zone 18	Downtown Hamilton	23
Zone 20	Hamilton Bayfront	26
Zone 21	Central Hamilton	25
Zone 22	East-central Hamilton	20
Zone 25	North-west Hamilton Mountain	19
Zone 26	North-central Hamilton Mountain	17
Zone 30	South-east Hamilton Mountain	23

*See Exhibit 2.1, Hamilton-Wentworth Survey Zones Map

4.1.3 Mode of Travel

Travel mode refers to the means of transport by which trips are made. For the summaries provided in this report, modes were grouped into four major categories: auto driver, auto passenger, transit user and other. The mode information was collected by means of the survey questionnaire, for trips to work and from work, separately.

Exhibit 4.6 illustrates the percentage of employees who use each of the four major mode categories for their trips from work. Two distributions are provided, one for total daily trips (24 hour) and one for p.m. peak hour trips.



The major characteristics of the travel mode distribution are as follows:

- o The vast majority of daily work trips are made by auto drivers.(70%)
- o Transit users represent 13%, auto passengers 10%, and other mode users 7% of daily work trips.

- o The transit passenger category includes users of the Hamilton Street Railway, Canada Coach Lines and GO Transit, which are the three major local/regional carriers. HSR users represent 90 of all transit users (or 12% of total employees). The remaining transit users are split fairly evenly between Canada Coach Lines and GO Transit. Further information on travel characteristics by individual transit carrier is included in later sections.
- o Users of other modes include two types: employees who walk to work, and employees who use a variety of miscellaneous modes including mainly taxi and bicycle, as well as motorcycle. Employees who walk represent 94% of these (or 6% of total employees).
- o The p.m. peak hour distribution is almost identical to that for the total daily. There are slightly more auto drivers, and slightly fewer transit and other mode users during the p.m. peak.

Mode choice information from this survey has been compared with the results of the 1974 Home Interview Survey. Significant differences were noted, which must be considered in terms of the differences in survey methodology. The mode choice distribution of total daily trips for these two surveys are as follows:

<u>Mode</u>	<u>Home Interview Survey</u>	<u>Employee Travel Survey</u>
Auto Driver	60%	70%
Transit User	12%	13%
Auto Passenger	20%	10%
Other	8%	7%

This comparison indicates that in terms of work trips, the Employee Travel Survey results include more auto drivers and fewer auto passengers. The rate of transit use for work trips is relatively similar.

The variations in mode choice by categories of employee occupation, firm type, firm size and geographic area are indicated in Table 4.3. The distribution of mode choice by employer type is also displayed graphically in Exhibit 4.7, and mode choice by employer size in Exhibit 4.8. The major observations drawn from this analysis are as follows:

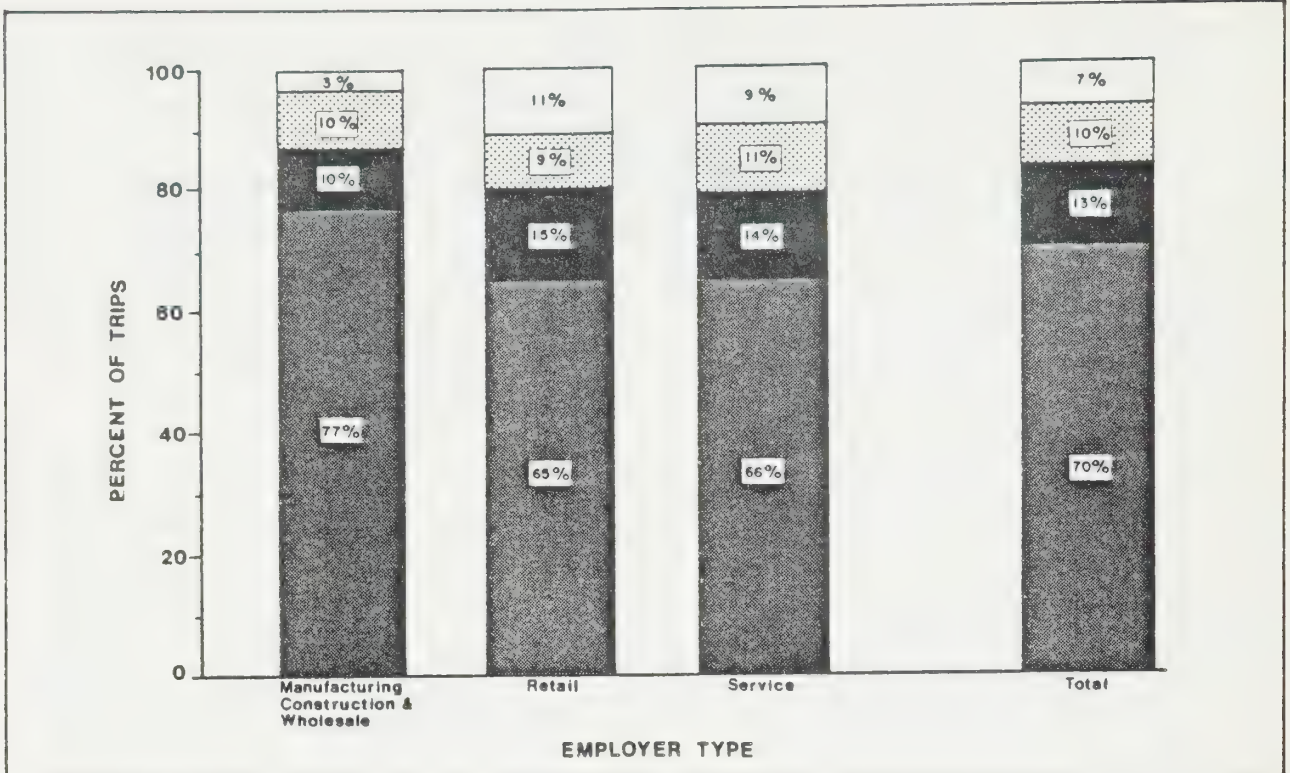
- o The auto driver mode is most prevalent among employees in executive, management and transportation occupations; manufacturing, construction and wholesale type firms; large firms; the Bayfront Industrial area and outlying geographic areas.
- o The auto passenger mode is used most by clerical and office employees.
- o Transit use is highest among employees in clerical, office and service occupations; retail and service firms; and medium size firms.
- o The rate of transit use to work locations in downtown Hamilton is twice as high as to other work areas.

TABLE 4.3

TRAVEL MODE CHOICE - 24 HOUR

(% OF EMPLOYEES)

	AUTO DRIVER	AUTO PASSENGER	TRANSIT	OTHER	TOTAL
REGIONAL AVERAGE	70%	10%	13%	7%	100%
<u>OCCUPATION</u>					
1. Clerical & Offc.	58	17	18	17	100
2. Sales	71	10	9	10	100
3. Service	64	8	19	9	100
4. Construction	78	12	9	1	100
5. Production	74	10	12	4	100
6. Transportation	80	9	6	5	100
7. Professional	75	8	9	8	100
8. Exec. & Mgmt.	90	3	4	3	100
<u>FIRM TYPE</u>					
1. Manf. Const. & Wholesale	77	10	10	3	100
2. Retail	65	9	15	11	100
3. Service	65	11	14	9	100
<u>FIRM SIZE</u>					
1. 1 - 19 employees	69	13	10	8	100
2. 20 - 100	68	10	12	10	100
3. 100 - 299	65	12	17	6	100
4. 300 - 499	59	7	29	5	100
5. 500+	74	9	12	5	100
<u>WORK ZONE</u>					
Zone 7 Urban Dundas	72	9	3	17	100
Zone 8 Urban Ancaster	95	3	0	2	100
Zone 10 West Glanbrook	88	10	1	2	100
Zone 14 S.W. Stoney Cr.	84	12	1	2	100
Zone 18 Downtown Ham.	56	9	26	9	100
Zone 20 Ham. Bayfront	82	8	8	2	100
Zone 21 Central Ham.	67	14	15	5	100
Zone 22 East-Cent. Ham.	71	9	12	8	100
Zone 25 N.W. Ham. Mtn.	77	11	8	5	100
Zone 26 N.C. Ham. Mtn.	64	8	10	18	100
Zone 30 S.E. Ham. Mtn.	78	11	9	2	100



LEGEND

TRAVEL MODE

AUTO DRIVER

AUTO PASSENGER

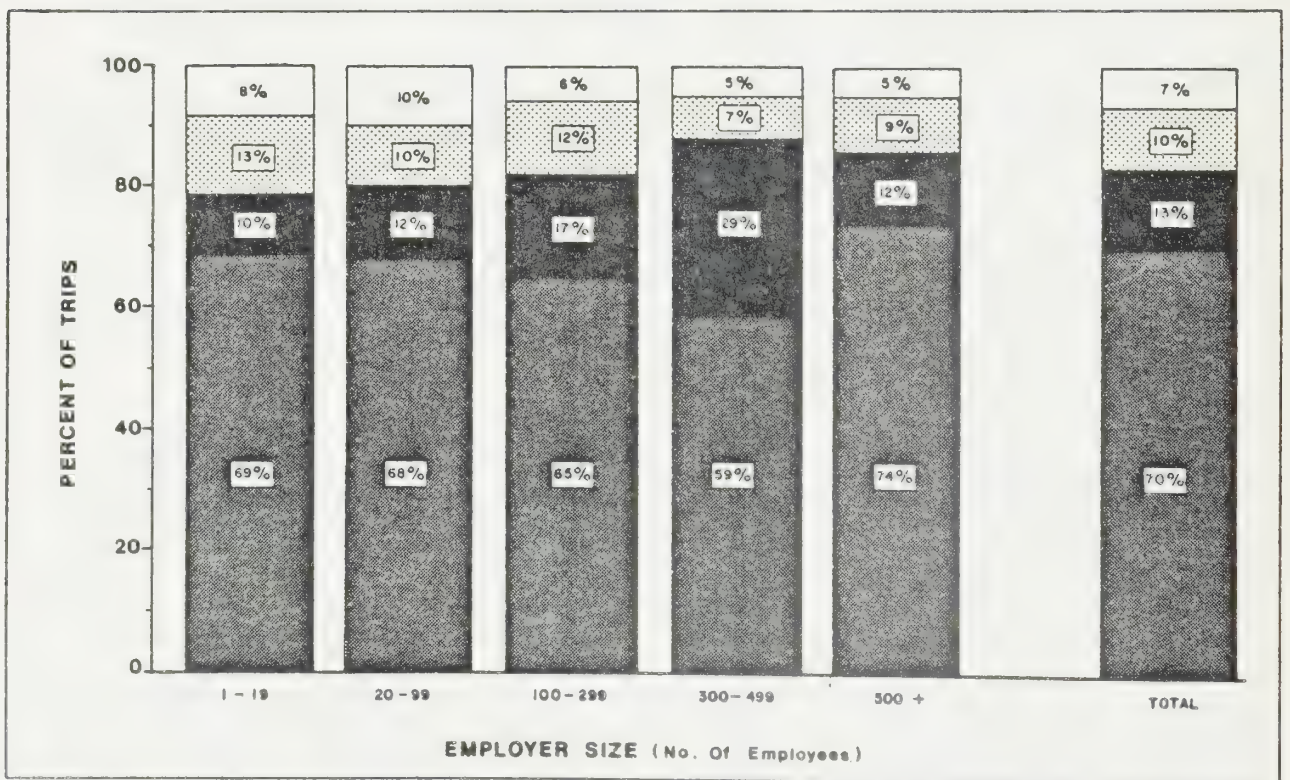
TRANSIT

OTHER

Exhibit 4.7
TRAVEL MODE CHOICE
BY EMPLOYER TYPE

24 HOUR PERIOD

Planning and Development Department
Hamilton-Wentworth Region



LEGEND

TRAVEL MODE

AUTO DRIVER

AUTO PASSENGER

TRANSIT

OTHER

Exhibit 4.8
TRAVEL MODE CHOICE
BY EMPLOYER SIZE

24 HOUR PERIOD

Planning and Development Department
Hamilton-Wentworth Region

- o Transit use is relatively low to suburban areas, and very low to the area municipalities outside of Hamilton.

Conclusions - Mode of Travel

The conclusions concerning mode of travel are summarized as follows:

- o The majority of employees drive an automobile to work, and the use of this mode has been increasing in importance over time.
- o The percentage of employees who travel as passengers in automobiles has decreased in importance over time.
- o The percentage of transit use for work trips has remained fairly constant over time.
- o Transit is used most by clerical, office, sales and service employees.

4.2 FACTORS RELATED TO MODE OF TRAVEL

In addition to the information on travel characteristics, information was collected concerning factors which influence travel, particularly those which influence travel mode choice. This information is required to determine why people use certain modes, and to assist in designing appropriate transportation system improvements.

Information on these factors has been collected and analyzed in two ways. Firstly, employees were asked to identify the specific reasons why they select certain modes. Secondly, employees provided information on a number of other characteristics which have been related to mode choice, such as the availability of an automobile, or proximity to transit services.

Both auto drivers and transit users were surveyed to determine the reasons for their choice of mode.

4.2.1 Driver Mode Choice Reasons

Employees who drive to work were asked to identify the reasons why they chose to drive.

Table 4.4 provides the percentage distribution of driver mode choice reasons, for the overall Region, and by categories of occupation, firm type, firm size and key geographic areas. The following general observations may be made concerning this data:

- o For the overall Region, the most important reasons for driving are that it is "faster than transit" (cited by 28% of drivers) and "convenient" (26%).

TABLE 4.4

DRIVER MODE CHOICE REASONS
(% OF EMPLOYEES)

	<u>Faster Than Transit</u>	<u>Driving Convenient</u>	<u>Only Means of Transportation</u>	<u>Personal Business</u>	<u>Trips Related to Work</u>	<u>Dropped Off Passenger</u>	<u>Transp. Goods for Work</u>	<u>Car or Van Pool</u>	<u>Physical Disability</u>	<u>Total</u>
<u>REGIONAL AVERAGE</u>	28%	26%	15%	11%	10%	4%	3%	2%	1%	100%
<u>OCCUPATION</u>										
1. Clerical & Office	31	30	10	14	5	5	1	3	1	100
2. Sales	24	21	10	10	19	7	7	1	1	100
3. Service	30	26	19	10	5	2	4	3	1	100
4. Construction	24	22	25	3	10	2	11	2	1	100
5. Production	32	29	19	11	3	2	0	3	1	100
6. Transportation	28	22	22	13	4	3	2	4	0	100
7. Professional	26	25	13	12	14	4	3	2	1	100
8. Exec. & Mgmt	24	25	10	8	26	3	2	1	1	100
9. Other	29	16	10	10	19	1	15	0	0	100
<u>FIRM TYPE</u>										
1. Manf. Const. & Whol.	31	27	16	11	7	3	1	3	1	100
2. Retail	29	26	14	12	8	6	4	1	0	100
3. Service	25	25	13	10	15	5	4	2	1	100
<u>FIRM SIZE</u>										
1. 1 - 19 Empl.	23	21	15	10	18	5	6	2	1	100
2. 20 - 99	26	26	15	10	12	4	4	2	1	100
3. 100 - 299	29	29	11	11	9	4	3	3	1	100
4. 300 - 499	26	26	15	11	12	6	2	1	1	100
5. 500+	32	28	15	12	5	3	1	3	1	100
<u>WORK ZONES</u>										
18. Downtown Hamilton	23	23	14	8	19	4	5	3	1	100
20. Bayfront Hamilton	32	28	16	12	5	2	1	3	1	100

- o Other relatively important reasons are that "driving is the only available mode" (15%); that drivers "needed car for personal business" (11%) or "needed car for work-related trips" (10%).
- o Major variations exist between employees of different occupational categories, indicating that the use of the personal car for work-related trips is relatively more important to employees in executive, managerial, and sales occupations.
- o Driving to work because it is the only available means of transportation is a relatively more important reason for employees in construction, transportation and production occupations.
- o Use of the personal auto for work-related trips is a relatively more important factor for employees in service firms and small firms.
- o Employees working in Downtown Hamilton make more work-related trips than average, while employees working in the Bayfront find driving particularly faster and more convenient than transit.

4.2.2 Transit Mode Choice Reasons

Employees who take transit to work provided information on the reasons why they use this mode. Table 4.5 summarizes the percentage distribution of major reasons for transit use, by geographic area of the Region. The reasons were grouped into two major categories, depending on whether transit use was selected for its own positive features, or simply because of the lack of alternative modes.

The major observations which can be made concerning the reasons for transit use are as follows:

- o For the overall Region, 75% of transit users are unable to drive to work, due to the lack of a vehicle and/or a drivers licence.
- o The remaining 25% of transit users select transit over other modes because it is convenient and/or less expensive than using a car (with convenience being cited slightly more frequently than cost).
- o For employees working in Downtown Hamilton a higher percentage of transit users select transit for reasons of convenience and/or cost (38%).
- o Employees working in the Bayfront and central Hamilton include approximately 25% who select transit due to its convenience and/or cost, the same percent as the Regional average.
- o Other employment areas have a relatively higher percentage of employees (up to 90%) who use transit because they have no alternative means of travel.

TABLE 4.5

TRANSIT MODE CHOICE REASONS
(% OF EMPLOYEES)

	<u>Transit Convenient</u>	<u>Transit Less Expensive</u>	<u>BOTH Convenient and Less Expensive</u>	<u>SUBTOTAL Convenient and/or Less Expensive</u>	<u>SUBTOTAL No Auto and/or No Licence</u>	<u>Total</u>
<u>REGIONAL AVERAGE</u>	10%	6%	9%	25%	75%	100%
<u>WORK ZONE</u>						
7. Urban Dundas	8	4	0	12	86	100
8. Urban Ancaster	50	0	0	50*	50*	100
10. West Glanbrook	0	0	0	0	100	100
14. South-East Stoney Creek	0	0	0	0	100	100
18. Downtown	14	10	14	38	62	100
20. Bayfront	8	7	10	25	75	100
21. Central Hamilton	9	6	12	27	73	100
22. East-Central Hamilton	6	1	7	14	86	100
25. North-West Hamilton Mtn.	7	3	7	17	83	100
26. North-Central Hamilton Mtn.	4	8	6	18	82	100
30. South-East Hamilton Mtn.	10	0	0	10	90	100

In addition to the reasons for mode choice specifically mentioned by drivers and transit users, information on a number of other personal and travel characteristics was obtained and tabulated against choice of mode. These characteristics include sex of employees, vehicle availability, walk time to transit services, and trip length. The purpose of this analysis is to illustrate the characteristics of drivers and transit users, and differences between them.

4.2.3 Mode Choice By Sex of Employee

Traditionally, males and females have had different travel characteristics, particularly in terms of transit use. Table 4.6 illustrates the variation in the use of transit modes by male and female employees.

The major observations noted are:

- o Approximately 70% of all auto drivers are male.
- o Approximately 60% of all auto passengers are female.
- o Transit users are 36% male and 62% female.
- o Users of inter-city transit carriers differ significantly from urban transit users. In particular, GO Transit users include 58% male and 37% female employees.
- o Male employees are predominately auto drivers (81%), with only 8% using transit, 6% auto passengers, and 5% using other modes.
- o Female employees include 52% auto drivers, and relatively high proportions of other mode users, including 21% using transit, 17% auto passengers, and 10% using other modes.

4.2.4 Mode Choice by Vehicle Availability

Employees were asked to indicate the total number of vehicles available to members of their households. Information about owned and leased vehicles was obtained separately, and then combined for this analysis.

Table 4.7 compares car ownership and employee's travel mode. The average number of vehicles available is also indicated, for each mode choice category.

TABLE 4.6

MODE CHOICE BY SEX OF EMPLOYEE

1) PERCENT MALE & FEMALE EMPLOYEES BY MODE

<u>MODE CHOICE</u>	<u>EMPLOYEE SEX</u>			<u>TOTAL</u>
	<u>MALE</u>	<u>FEMALE</u>	<u>NOT STATED</u>	
1. Auto Driver	71%	27%	2%	100%
2. Auto Passenger	38	60	2	100
3. Total Transit	36	62	2	100
a) HSR	35	63	2	100
b) GO Transit	58	37	5	100
c) Canada Coach	18	67	15	100
4. <u>Other Modes</u>	<u>45</u>	<u>54</u>	<u>1</u>	<u>100</u>
TOTAL All Modes	61%	37%	2%	100%

2) PERCENT USE OF MODES BY MALE & FEMALE EMPLOYEES

<u>MODE CHOICE</u>	<u>EMPLOYEE SEX</u>		
	<u>MALE</u>	<u>FEMALE</u>	<u>TOTAL</u>
1. Auto Driver	81%	52%	70%
2. Auto Passenger	6	17	10
3. Total Transit	8	21	13
4. <u>Other</u>	<u>5</u>	<u>10</u>	<u>7</u>
TOTAL All Modes	100%	100%	100%

TABLE 4.7

MODE CHOICE BY VEHICLE AVAILABILITY

(% OF EMPLOYEES)

MODE CHOICE	VEHICLES AVAILABLE				TOTAL	AVE. NO. VEHICLES
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3+</u>		
1. Auto Driver	1%	42%	44%	13%	100%	1.7
2. Auto Passenger	11	57	26	6	100	1.3
3. Total Transit	32	46	19	3	100	0.9
a) HSR	32	46	19	3	100	0.9
b) GO Transit	52	27	18	3	100	0.7
c) Canada Coach	9	47	42	2	100	1.4
4. Other	25	53	16	6	100	1.0
TOTAL REGIONAL AVE.	8%	45%	37%	10%	100%	1.5

A review of this data provides the following major observations:

- o The average employee in the Region has 1.5 vehicles available to members of their household. This includes 8% of employees with no vehicles, 45% with 1 vehicle, 37% with 2 vehicles, and 10% with 3 or more vehicles.
- o Employees who drive to work have a higher than average 1.7 vehicles available. Most employees who drive (57%) have 2 or more vehicles.
- o Employees who travel to work as auto passengers have a lower than average 1.3 vehicles available. Most of these employees (57%) have only 1 vehicle.
- o Transit users have an average of only 0.9 vehicles available for household use. Many such employees (32%) have no vehicles available, while 46% have 1 vehicle.
- o HSR transit users have the same vehicle ownership characteristics as overall transit users. GO Transit users have a lower vehicle availability, while Canada Coach users have a considerably higher number of vehicles.
- o Employees using other modes have similar characteristics to those of overall transit users.

4.2.5 Mode Choice By Walk Time to Transit Service

Employees were questioned as to their perception of the length of time required to walk from their home to the nearest transit service they could take to work. This information can be used to determine how the availability and accessibility of transit service influences travel mode choice.

Table 4.8 provides a summary of the walk time (in minutes) from home, to transit service, by mode choice category. The percentage of employees who fall into each of 5 categories of walk time are indicated for the overall survey and for users of each mode. The average walk time to transit service is also provided for each mode.

The key observations which can be made concerning this aspect of travel characteristics are as follows:

- o On average, 57% of employees in the Region live within a 5 minute walk of a suitable transit service, and 76% live within a 15 minute walk. The average walk time is 14 minutes.

TABLE 4.8

<u>MODE CHOICE BY WALK TIME TO TRANSIT SERVICE</u>								
<u>(% OF EMPLOYEES)</u>								
<u>MODE CHOICE</u>	<u>1-5</u>	<u>6-15</u>	<u>WALK TIME (MIN.)</u>			<u>NON RESP</u>	<u>TOTAL</u>	<u>AVE. WALK TIME (MIN)</u>
			<u>16-30</u>	<u>31-60</u>	<u>61+</u>			
1. Auto Driver	52%	20%	6%	4%	9%	9%	100%	18
2. Auto Passenger	66	18	6	2	3	5	100	10
3. Total Transit	73	24	1	0	0	2	100	4
a) HSR	76	21	1	0	0	2	100	4
b) GO Transit	34	61	4	0	0	1	100	9
c) Canada Coach	44	24	21	3	0	8	100	10
4. Other	79	10	1	0	1	9	100	4
TOTAL-REGIONAL AVE.	57%	19%	5%	3%	7%	9%	100%	14

- o Employees who drive to work have an average walk time to transit service of 18 minutes. Drivers include a lower than average proportion having short walk trips (only 52% within a 5 minute walk).
- o Auto passengers have a shorter than average walk time, averaging 10 minutes. 66% live within a 5 minute walk.
- o Total transit users have the shortest average walk times to transit service, of 4 minutes. Most employees who use transit (73%) live within a five minute walk and almost all live within a 15 minute walk.
- o Users of the two inter-city transit carriers, GO Transit and Canada Coach have somewhat longer average walk times, of 9 and 10 minutes, respectively.
- o Users of other modes (most of whom walk to work) have an average walk time to transit of 4 minutes, with an even greater proportion of short walk times than for transit users (79% with a 5 minute walk).

4.2.6 Mode Choice by Trip Length

Information was obtained on trip length, or the time required by employees to reach their place of work. It has been cross-tabulated against mode choice, to determine the manner in which trip length relates to mode choice.

Table 4.9 indicates the percentage of employees within each trip length categories (by 10 and 15 minute intervals). The values are provided for the overall region, and by travel mode categories. Average trip lengths for each mode are also shown.

This trip length information shows the following characteristics:

- o Auto drivers travel for an average of 22 minutes, with 69% travelling for between 11 and 30 minutes.
- o Auto passengers have a shorter than average trip length of 18 minutes, with 72% travelling for between 1 and 20 minutes.
- o Total transit users have the longest trip length, at 35 minutes. Canada Coach and GO Transit users have even longer trip lengths than overall transit users or HSR users (45 minutes for Canada Coach).
- o Users of other modes (particularly walk) have very short trip lengths averaging 12 minutes, with a majority of trips under 10 minutes in length.

TABLE 4.9

MODE CHOICE BY TRIP LENGTH								
(% OF EMPLOYEES)								
MODE CHOICE	TRIP LENGTH (Minutes)						TOTAL	AVE. TRIP LENGTH (min)
	1-10	11-20	21-30	31-45	46-60	61+		
1. Auto Driver	16%	41%	28%	11%	3%	1%	100%	22
2. Auto Passenger	26	46	17	7	3	1	100	18
3. Total Transit	5	19	29	29	14	4	100	35
a) HSR	5	20	29	28	15	3	100	34
b) GO Transit	2	13	45	26	4	10	100	38
c) Canada Coach	5	11	23	39	1	21	100	45
4. Other	64	24	8	3	1	0	100	12
TOTAL REGIONAL AVE.	19%	37%	26%	13%	4%	1%	100%	23

4.2.7 Type of Parking Facility Used

Employees who drive to work were requested to provide information on the type of parking facility they use, including its location and cost.

Table 4.10 indicates the percentage of auto driver employees who use each of 4 types of parking facilities. These categories include free on-street parking; metered on-street parking; free parking in a lot or garage; and paid parking in a lot or garage. The distribution by parking type is provided for the overall Region, and by categories of occupation, from type and firm size.

The major observations related to parking type are:

- o For the Region as a whole, 78% of employees use free lot or garage parking, while the remainder use paid lot (13%) or free on-street (9%) parking. Very few employees use metered street parking (0.2%).
- o Free lot parking is used relatively more extensively by employees in production and transportation occupations, manufacturing and retail firms, and medium size firms.

TABLE 4.10

TYPE OF PARKING FACILITY USED

(% OF EMPLOYEES)

	<u>FREE ON-STREET</u>	<u>METER ON-STREET</u>	<u>LOT/ GARAGE FREE</u>	<u>LOT/ GARAGE PAID</u>	<u>TOTAL</u>
REGIONAL AVERAGE	9%	0%	78%	13%	100%

OCCUPATION

1.	Clerical & Office	16	1	68	15	100
2.	Sales	7	1	80	12	100
3.	Service	13	0	75	12	100
4.	Construction	19	0	78	3	100
5.	Production	6	0	90	4	100
6.	Transportation	7	0	90	3	100
7.	Professional	8	0	66	26	100
8.	Executive & Managerial	2	0	80	18	100

FIRM TYPE

1.	Manf. Constr. & Wh.	4	0	90	6	100
2.	Retail	7	0	86	7	100
3.	Service	16	0	54	25	100

FIRM SIZE

1.	1 - 19 employees	19	0	66	15	100
2.	20 - 99	10	0	78	12	100
3.	100 - 299	7	0	83	10	100
4.	300 - 499	6	0	87	7	100
5.	500+	5	0	81	14	100

- o Paid lot parking is used mainly by employees in professional and executive occupations, service firms and small firms.
- o Free on-street parking, is used mainly by employees in construction, clerical and service occupations, service firms and small firms.
- o Metered on-street parking is used to a very limited extent by employees in clerical, office and sales occupations.

4.2.8 Summary of Factors Related to Mode Choice

To summarize some of the foregoing observations, it may be noted that cost is not the most important factor in determining mode of travel. Personal automobile use continues to be the prevalent mode used for work travel in the Region despite the fact that fuel prices have increased significantly over the past few years.

Approximately half of the automobile drivers are captive auto users who either need their cars for work or have no other means available. It can be assumed that changes in transit service or marketing will not significantly attract these employees to transit use.

Of the auto drivers who are not captive, approximately half stated travel time and half stated convenience as being their reason for driving rather than using transit. This suggests that efforts to increase transit use for work trips must concentrate on providing faster and more direct transit service between places of employment and the major residential areas in which employees live.

Even with transit improvements, not all auto drivers can be attracted to transit. For example, in downtown Hamilton, which is served by extensive transit service, almost half of the auto drivers continue to select this mode because it is faster or more convenient than transit.

In the Bayfront Industrial area, there is a higher percentage of auto drivers who chose auto use because it is faster or more convenient. This suggests that there is a potential for increasing transit use by increasing direct service to this area.

The major difference in average travel time between auto drivers and transit users suggests that new types of transit service such as express buses would have to be introduced to attract employees who presently drive autos and for whom travel time is a major consideration.

Any effort to attract auto drivers to transit use must focus on a long-term strategy to change basic attitudes to travel. The availability of a vehicle for work travel has a major influence on the rate of transit use, as shown by the higher household auto ownership for auto drivers as compared to transit users. This reflects a long-term investment and commitment to auto use. With a second or third family car available for work travel, employees will not be likely to respond immediately to changes in transit service. Strategies to attract choice transit riders must be in place long enough to influence car ownership patterns.

Another major factor which encourages auto use appears to be the availability of parking. Most employees who drive to work utilize free parking, especially in work areas such as the Bayfront where land is readily available for parking. Any changes in the availability or cost of parking would be expected to influence the use of driving and transit modes. Conversely, any strategy to increase transit usage must also address the availability and cost of parking.

4.3 TRAVEL PATTERNS

In addition to the information on basic travel characteristics discussed in the preceeding section, the Employee Travel Survey provides information on travel patterns. These travel patterns are expressed as origin-destination (O-D) patterns, representing flows of people between geographic areas. That is, the work trips made by individual employees between their work locations and home locations are summed, to produce overall travel patterns. These travel patterns are important input into the process of planning transportation facilities and transit services.

Origin-destination information from the Employee Travel Survey is available for the eleven work zones which were surveyed. Data was analyzed to determine the distribution of home areas associated with employees in each of these employment or work areas. The following sections summarize the results of this origin-destination analysis, in terms of:

- Total person travel patterns (all road and transit users, on a daily or 24 hour basis)
- Transit person travel patterns (daily transit users)
- Modal split patterns (transit use rates, or the percent which transit users comprise of total persons)

Appendix D contains origin-destination tables showing the actual number of trips between categories of zones for total trips, transit trips, and modal split rates.

4.3.1 Total Person Travel Patterns

Surveyed employees provided information on both their home location and work location. These two items were cross tabulated to provide origindestination tables for the eleven employment areas surveyed.

Total trip patterns are described in terms of the distribution of home locations associated with the major employment areas. The Hamilton Bayfront and Downtown Hamilton areas are discussed separately in the following sections.

Hamilton Bayfront

The employment area with the greatest number of employees in Hamilton-Wentworth is the Hamilton Bayfront Industrial area. The flow map in Exhibit 4.9 illustrates the relative distribution of home locations associated with employees who work in this area. The percentage of Bayfront employees living in each residential area is represented by the width of the arrows.

The origin-destination pattern for persons working in the Bayfront may be summarized as follows:

- o Most Bayfront employees live in Hamilton (66%). The major associated residential areas within Hamilton are the Hamilton Mountain (29%) and east-central Hamilton (25%).
- o An additional 19% of Bayfront employees live in the other area municipalities within Hamilton-Wentworth, with 8% living in Stoney Creek and the remainder distributed fairly evenly among the other four municipalities (2% - 3% each).
- o 15% of Bayfront employees live outside Hamilton-Wentworth, with almost half of these living in Burlington (7%), 4% living in Niagara and the remainder in other areas.

Downtown Hamilton

Employees working in Downtown Hamilton have a distribution of home locations, similar to that for the Bayfront area, as indicated in Exhibit 4.10. The major characteristics of this origin-destination pattern may be summarized as follows:

- o Most Downtown employees live in Hamilton (63%), with the majority of these living on the Hamilton Mountain (28%), and in east-central Hamilton (15%). Other areas of significant concentration are Downtown Hamilton (10%) and west Hamilton (8%).
- o 13% of Downtown employees live in other area municipalities within Hamilton-Wentworth, with approximately 3% living in each of Flamborough, Dundas, Ancaster, and Stoney Creek, and 1% in Glanbrook.
- o 24% of Downtown employees live outside of Hamilton-Wentworth with half of these living in Burlington (12%) and many of the remainder living in Oakville and further east.

Other Employment Areas

Similar origin-destination information is available for the other employment areas surveyed. These include east-central Hamilton, zones on the Hamilton Mountain, and suburban zones in Ancaster, Dundas, Glanbrook and Stoney Creek. These areas contain fewer employees than work in the Bayfront and Downtown Hamilton, and thus contribute relatively fewer work trips to overall travel patterns.



LEGEND



**TOTAL PERSON TRAVEL PATTERNS FOR
HAMILTON BAYRONT EMPLOYEES (24 HR)**

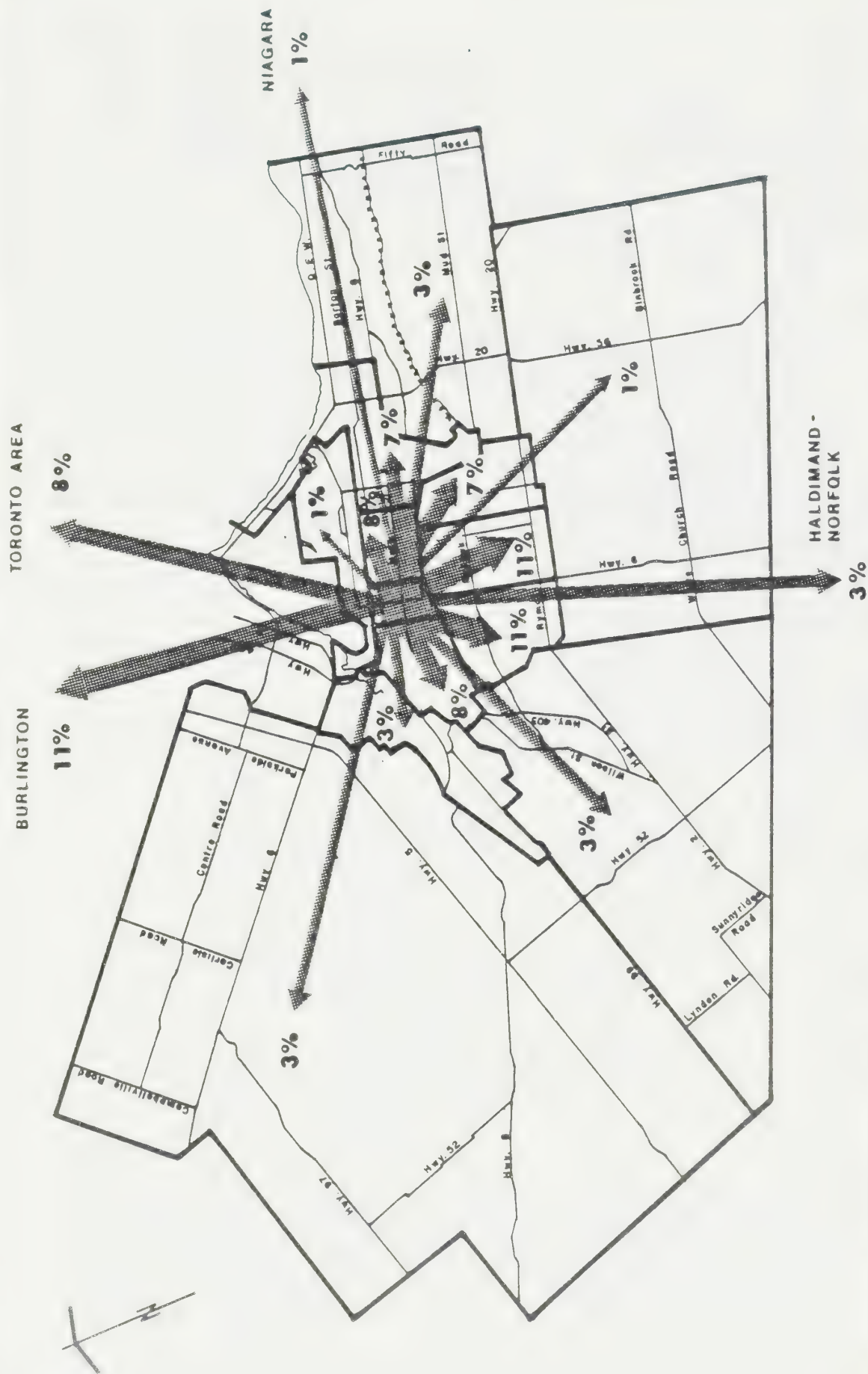


Exhibit 4.10

**TOTAL PERSON TRAVEL PATTERNS FOR
DOWNTOWN HAMILTON EMPLOYEES (24 HR)**

**% OF TOTAL DOWNTOWN EMPLOYEES
RESIDING IN THIS AREA.**

LEGEND

A number of key points may be made concerning characteristics of work trip patterns to these areas:

- o The majority of employees live within Hamilton, as is the case for Bayfront and Downtown employees.
- o Within Hamilton, the Hamilton Mountain is an important residential area for most work areas.
- o The degree of self containment for these other work areas is generally much higher than for the Bayfront and Downtown. For example, 57% of employees who work in surveyed areas on the Hamilton Mountain also reside on the Mountain and 41% of employees who work in the urban areas of Dundas and Ancaster also reside there. This compares with the 10% of Downtown Hamilton employees who live in the Downtown.

4.3.2 Transit Person Travel Patterns

This section summarizes information on the magnitude and orientation of existing transit travel patterns.

The information on transit travel patterns was obtained by producing cross-tabulations of employment location and home location (as was done for total persons), for only those respondents using transit. The results were summarized in the form of an origin-destination table showing the distribution of home locations for transit users working in the 11 surveyed employment areas. This table is provided in Appendix D.

The major characteristics of transit travel patterns are summarized briefly here:

- o Downtown Hamilton is the employment area with the greatest number of employees who use transit. Almost all Downtown employees using transit live within Hamilton (86%), particularly on the Mountain (46%), and in east-central Hamilton (23%). Six percent (6%) live elsewhere in Hamilton-Wentworth and 8% live outside of Hamilton-Wentworth, mainly in the Burlington to Toronto area.
- o Employees working in the Hamilton Bayfront area use transit to a lesser degree than employees working in the Downtown. These Bayfront employees who use transit live almost exclusively in Hamilton (95%), particularly on the Mountain (36%) and in east-central Hamilton (38%). Four percent (4%) of these transit users live elsewhere in Hamilton-Wentworth and 1% live outside the Region, mainly in Burlington.
- o Employees who work in east and central Hamilton, and use transit for work travel, have a distribution of home locations similar to the Downtown and Bayfront with 93% living in Hamilton.

- o Employees who work on the Hamilton Mountain and use transit, have slightly different O-D patterns, with 97% living in Hamilton, including 61% living on the Hamilton Mountain.
- o Employees working in suburban zones outside Hamilton exhibit very low transit use.

4.3.3 Modal Split Patterns

A further type of analysis was undertaken to determine the relative significance of transit use to employment areas within Hamilton-Wentworth. Modal split may be defined as the percentage which transit users represent of total persons travelling. Modal split rates thus enable comparison of the relative rates of transit use between areas, rather than the absolute numbers of transit users.

Modal split rates were calculated using the origin-destination tabulations described earlier for total persons and transit persons. A third O-D table or interchange table was produced, containing the modal split values (transit persons as a percent of total persons) for each combination of work zone and home zone surveyed. This modal split table is provided in Appendix D and is summarized in Exhibit 4.11.

The matrix in Exhibit 4.11 illustrates modal split values for various groupings or categories of zones, including 7 categories of work zone and 10 categories of home zone. The values are shown symbolically within intervals of 10%, to enable easier comparison. Values are for total daily work travel over a 24 hour period.

The modal split patterns indicated by the survey results may be summarized as follows:

- o Trips to work locations in Downtown Hamilton display the highest modal split rates. Over 40% of Downtown employees who live in central, east and north Hamilton, and on Hamilton Mountain, use transit for travel to work. Over 30% of Downtown employees who live in west Hamilton use transit, as do 11% to 30% of Downtown employees who live in suburban zones in Stoney Creek, Dundas and Ancaster. Downtown employees living elsewhere, such as the Downtown itself, rural areas and external areas, have minimal transit use of under 11%. On average, over 20% of Downtown employees use transit.
- o Moderate modal split rates are indicated for trips to work in central Hamilton. The modal split values for work trips between central Hamilton and all other areas of Hamilton are over 10%, with the modal split slightly higher to Hamilton Mountain. A low rate of transit use occurs between central Hamilton and suburban or rural areas outside Hamilton.
- o Trips to work location in Hamilton Bayfront or on the Hamilton Mountain are also associated with fairly low modal split rates of 11-20% from most areas of Hamilton. Transit use rates are zero or negligible to these zones from some suburban and rural zones.

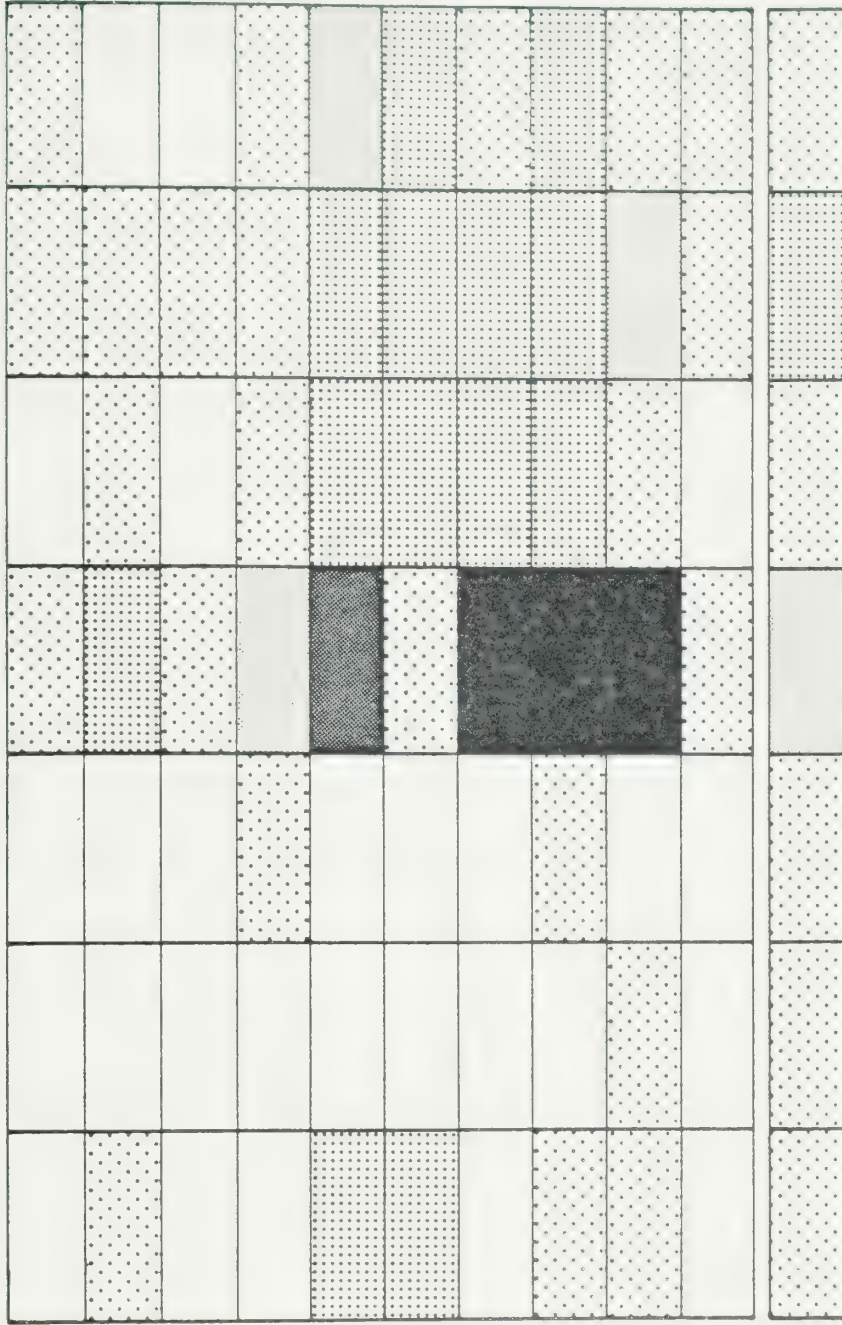
WORK ZONE

7 & 8 10 14 18 20 21 & 22 25, 26, 30
URBAN DUNDAS WEST HAMILTON CENTRAL HAMILTON
& ANCASTER GLANBROOK ST. CREEK HAMILTON MOUNTAIN

HOME ZONE

1-5 FLAMBOROUGH
6-9 DUNDAS & ANCASTER
10-11 GLANBROOK
12-15 STONEY CREEK
16-17 WEST HAMILTON
18 DOWNTOWN HAMILTON
19, 20, 24 BAYFRONT & BEACH
21-23 CENTRAL & EAST HAM.
25-30 HAMILTON MOUNTAIN
31-38 EXTERNAL

TOTAL



LEGEND

MODAL SPLIT



Exhibit 4.11

MODAL SPLIT VALUES FOR MAJOR
WORK AND HOME ZONE CATEGORIES (24 HR.)

Planning and Development Department
Hamilton Wentworth Region

- o Very low modal split rates exist for trips between suburban work zones in Dundas, Ancaster and Stoney Creek, and the Downtown or central Hamilton zones. Otherwise, there is little transit use to these areas.

Conclusions - Travel Patterns

The following key observations summarize the travel patterns of employees:

- o The Bayfront Industrial area attracts the highest number of work trips made mostly by employee living within Hamilton, especially on Hamilton Mountain and in east Hamilton.
- o Downtown Hamilton also attracts a high number of work trips having similar origin-destination patterns primarily from residential areas in Hamilton.
- o Work trips from residential areas external to Hamilton-Wentworth account for approximately 16% of all work trips, and 24% of trips to Downtown Hamilton. Trips from Burlington account for approximately half of all external trips.
- o The rate of transit use for work trips varies widely throughout Hamilton-Wentworth. Transit use is relatively high to Downtown Hamilton; moderate to other urban areas in Hamilton including the Bayfront; and transit use is very low or negligible to suburban and rural areas.

4.4 COMMENTS AND SUGGESTIONS

Employees completing the travel survey were asked to provide any general comments and suggestions they might have for improving transportation in Hamilton-Wentworth. A significant number of employees responded with a variety of thoughtful and constructive suggestions. Of all employees surveyed, 17% provided comments and suggestions, which have been summarized into 5 categories. The percentage of employees who provided each type of comment is shown in Table 4.11 for the overall Region and for each work macro zone.

The distribution of comments may be described as follows:

- o Optimization of the existing HSR services was suggested by 41% of employees making comments. This includes suggestions for faster travel times and provision of conveniences such as more bus shelters.
- o Expansion of HSR services to outlying areas was suggested by 13% of these employees. Areas of the Hamilton Mountain, Dundas, Stoney Creek and Glanbrook (especially Hamilton Airport at Mount Hope) are perceived to be under-served by transit.

COMMENTS AND SUGGESTIONS

(% OF EMPLOYEES)

	Optimize Existing HSR Transit Service	Extend HSR Transit Service	Roadway System Improvements	Express Transit Service	Inter-City Transit Service	Other	Total
REGIONAL AVERAGE	41%	13%	12%	11%	5%	18%	100%
<u>WORK ZONE</u>							
7. Urban Dundas	32	52	4	4	4	4	100
8. Urban Ancaster	0	0	0	0	0	0	0
10. West Glanbrook	0	67	33	0	0	0	100
14. South-East Stoney Creek	23	35	16	7	17	2	100
18. Downtown Hamilton	48	16	7	9	6	14	100
20. Bayfront Hamilton	32	9	16	17	4	22	100
21. Central Hamilton	44	11	11	5	5	24	100
22. East-Central Hamilton	65	7	9	2	5	12	100
25. North-Central Hamilton Mtn.	39	20	9	7	7	18	100
26. North-Central Hamilton Mtn.	60	21	3	4	4	8	100
30. South-East Hamilton Mtn.	30	33	7	10	10	10	100

- o Roadway system improvements were suggested by 12% of these employees. In particular, the need for greater accessibility to the Bayfront Industrial Area and Downtown Hamilton was emphasized. Suggested improvements included expansion of existing roadways, construction of new roadways, and traffic operation improvements dealing with traffic signal synchronization and railway traffic conflicts.
- o Express transit service was suggested by 11% of employees. Those people working in the major employment areas, such as the Bayfront Industrial Area and Downtown Hamilton, are particularly interested in express service. The need to design such service to coincide with the work starting and finishing times of shift workers in the Bayfront was mentioned.
- o Improved inter-city transit service was suggested by 5% of employees. Transit services to areas such as Burlington, Oakville and Niagara are felt to be in need of improvement.

Several other suggestions regarding transportation were made by employees. Some employees wish to carpool, but find it difficult to locate other people with similar travel patterns. Therefore, the creation of a central carpool matching agency was suggested. Other comments deal with bicycle use, including requests for appropriate routes and facilities.

Some variation exists in the types of comments made by employees working in different geographic areas. As shown in Table 4.11, the employees most concerned with improvements to existing transit services were those working in central Hamilton areas both above and below the Escarpment, including the Downtown. On the other hand, employees who suggested route extensions tended to work in peripheral areas in Dundas, Glanbrook and Stoney Creek as well as on Hamilton Mountain. Express bus service was primarily requested by employees working in the Bayfront or in Downtown Hamilton. Roadway system improvements were mainly related to the Bayfront and outlying areas.

The general comments and suggestions made by employees indicate that transportation system improvements should focus on transit facilities as much as, or more than, roadway facilities. This is implied by the fact that 70% of the comments made dealt with potential improvements in the transit system (including improving the efficiency of existing routes, extending routes, and providing express bus service). Only 12% of comments dealt specifically with roadway system improvements, while the remainder dealt with other issues such as car pooling or bicycling. Thus, there seems to be considerable potential for increasing transit use, by means of service improvements.

5.0 POLICY OPTIONS AND DIRECTIONS

The information on work trip patterns and travel characteristics derived from the Employee Travel Survey can be used as the basis for assessing policies on the provision of transportation services, the expansion of transportation systems or land use controls relating to transportation. Hamilton-Wentworth has existing policies contained in its Official Plan and policies of Council that address transportation related issues including:

- o The provision of Regional transit service
- o The orientation of transit routes
- o The provision of inter-regional transit connections
- o The use of express transit service
- o The construction of exclusive transit lanes
- o The provision of parking areas
- o The expansion of the Regional road system

Recent studies in Hamilton-Wentworth and elsewhere, and literature on transportation related matters suggest other policy areas that should be investigated in terms of employee travel behaviour. These areas of potential policy include:

- o The alteration of the work week or work day in order to modify peak demands; and
- o The introduction of ridesharing programs such as car or van pooling to reduce the number of vehicles on the road system.

The following policy review is related to work travel demands as measured by the Employee Travel Survey. A number of the policy areas are affected by other trip purposes and must be assessed further in terms of total travel demand. The purpose here is to assess the potential for implementation of new or broadened policy initiatives. Decisions to take specific actions to implement policies must be based on more detailed assessment of the feasibility and the cost-effectiveness of those specific actions.

The following sections deal with each relevant policy option in terms of: its purpose; criteria for determining its suitability; present Regional policies and an assessment of its potential effectiveness in relation to the findings of the Employee Travel Survey.

5.1 TRANSIT COVERAGE

Existing Policies

The extent of local transit coverage within Hamilton-Wentworth is dependent on whether an area is inside or outside the Urban Transit Service Area (U.T.S.A.). Inside the U.T.S.A., coverage is designed to provide service to the urban area with the objective of having all development within a 15 minute walking distance of a transit route. Outside the U.T.S.A., the level of transit service is determined by the Area Municipality based on cost effectiveness. In terms of servicing all work trips equally well, it is desirable to have similar criteria for transit coverage within the entire urbanized area and within areas serving similar functions in terms of commuters.

Data Review

A review of the Employee Travel Survey results indicates:

- A significant number of the employees in downtown Hamilton and the Bayfront Industrial Area commute from area municipalities outside of Hamilton (up to 20%).
- A significantly lower proportion of employees commuting from the other area municipalities use transit than do those coming from Hamilton. Captive transit riders dominate the users from outside Hamilton.
- The decision to use transit is strongly influenced by the length of time required to walk to transit services. Less than one percent of transit users are willing to walk more than 15 minutes.
- Convenience is an important criteria which people use in selecting their mode of travel.

Conclusions

On the basis of this analysis of existing policies and employee travel characteristics, it is possible to recommend the following:

If transit is to be promoted as a viable alternative mode of travel to major employment areas, then the Urban Transit Services Area should be reviewed on the basis of work trip commuter patterns within the urban area.

5.2 TRANSIT ORIENTATION

Existing Policies

The present transit service is oriented toward Downtown Hamilton with over 90% of the bus routes passing through or terminating in the Downtown. There are three transit routes oriented directly to the Bayfront area for peak hour service of which two provide only peak hour service.

The Hamilton-Wentworth Official Plan calls for two sub-regional centres to serve as focal points for transit service. These include one in the vicinity of Limeridge Mall on the Hamilton Mountain, and one in the vicinity of Eastgate Square in Stoney Creek.

It is desirable to orient transit service to areas of major employment or activity (i.e. shopping centres) centres that attract a consistently high number of trips.

Data Review

The Employee Travel Survey indicates that:

- o There are two major employment areas in Hamilton-Wentworth, namely, the Downtown and Bayfront;
- o Transit usage is relatively high to Downtown Hamilton where transit services are concentrated; and
- o Transit usage is considerably lower to the Bayfront Area, where transit service is mainly indirect.

Conclusions

There is a potential to increase transit usage to the Bayfront with direct transit service between this area and the major places of residence of employees (namely the Hamilton Mountain and east Hamilton and Stoney Creek). The service would have to be unique with trip times concentrated around shift changes, as there are very few trips for other than work purposes into the area.

Implementation of such additional transit services would have to be staged over time to allow a change in personal travel characteristics. Such services must also be coordinated with other policies regarding ridersharing programs and parking.

5.3 INTERCITY TRANSIT SERVICES

Existing Policies

Intercity transit services are provided primarily by Canada Coach Lines and GO Transit. These services connect Hamilton-Wentworth with points such as Burlington, Oakville, Toronto, Guelph, Kitchener, Brantford, Haldimand Norfolk and Niagara.

The related Official Plan policies are designed to encourage commuter transit connections to Downtown Hamilton and to encourage the province to expand inter-regional transit connections between Hamilton and Burlington and points east in order to serve commuter travel into Hamilton.

Inter-regional transit services serve three functions: to provide strategic links between urban areas for all trip purposes; to provide transit accessibility to the rural areas of Hamilton-Wentworth; and to accommodate commuter work trips into and out of the Region. Employee Travel Survey results can only be used to evaluate the commuter role of inter-regional transit.

Survey Results

The survey results indicate that:

- o Approximately 17% of the persons employed within Hamilton-Wentworth Region reside outside the Region.
- o A significant proportion (24%) of employees in Downtown Hamilton reside outside Hamilton-Wentworth, with 17% residing in Burlington.
- o 15% of Bayfront employees reside outside Hamilton-Wentworth, with 7% residing in Burlington.
- o Inter-regional transit use for commuting to employment areas other than Downtown Hamilton including the Bayfront is insignificant.

Conclusions

The size of the work force commuting between Burlington and Downtown Hamilton suggests a larger potential demand than indicated by the present use of transit services. The market share or rate of transit use could be increased by improvements such as the proposed GO ALRT line to Hamilton.

The size of the work force commuting between Burlington and the Bayfront Industrial area suggests a high potential for direct inter-regional transit connections between these areas. This service should be designed to match the work start times of shift workers. Its implementation should be staged and coordinated with other policy measures.

5.4 EXPRESS TRANSIT AND TRANSIT WAYS

Existing Policies

At present, the H.S.R. provides no express service except for the semi-express service between Downtown Hamilton and Dundas. There are no exclusive bus ways except for the south leg of King Street in the vicinity of Gore Park which is currently being implemented. The Hamilton-Wentworth Official Plan calls for preferential or exclusive bus lanes on arterial roads where demand warrants and application is feasible.

Express bus service should be considered between areas of high actual or potential demand. Transit ways or exclusive transit lanes should be considered only where there is a high concentration of transit service, and where road congestion has a significant impact on the speed of transit service.

Survey Results

- o There is a high concentration of transit service into Downtown Hamilton;
- o The majority of transit users to both the Downtown and the Bayfront are captive riders; and
- o The reasons for selection of mode indicate that the only way to attract a higher percentage of or discretionary transit riders is to provide more convenient and faster transit service.

Conclusions

Significant numbers of potential transit riders could be attracted by express transit routes from the Downtown to the southern mountain, Stoney Creek, Dundas and Ancaster. Potential transit riders could be attracted to express transit routes from the Bayfront Industrial area to the southern Hamilton Mountain and Stoney Creek.

The feasibility of exclusive transit lanes or transit ways could be considered in the corridors leading to Downtown Hamilton from the west and east (King and Main Streets), and from the south (James and John Streets).

5.5 FLEXIBLE WORK HOURS

Existing Policies and Applications

Flexible or staggered work hours involve policies established by employers that allow employees to vary their work starting times and/or the number of hours or days they work during a week. The objective is to spread the work start and finish time of employees over a longer period of time and thus reduce peak hour travel demands and resulting traffic congestion.

Currently, all employers in Downtown Hamilton with over 500 employees have some form of either flexible or staggered work hour policies. In the Bayfront area, although there are few companies with actual flexible hour policies, over 90% of employees work at companies that have shift operations. The Region has no specific policies on the promotion of flexible work hours although the Region does provide a flexible work hour program for its own employees.

Criteria

Flexible work hours are most effective in office environments of relatively large firms, where the job functions of employees are largely independent. Flexible hours are much less suited to large manufacturing plants where the jobs are more inter-dependent and the plants operate on a continuous shift basis.

The Employee Travel Survey results indicate that:

- o Work travel to downtown Hamilton is very sharply peaked in the morning and evening, which suggests that the option for flexible hours offered by the large companies is probably not being taken full advantage of by the employees. It is estimated that peak hour traffic into the downtown could be reduced by approximately 5% if available flexible hours programs were fully utilized.
- o Work travel to the Bayfront is less sharply peaked, although the vast majority of employees travel to work in the 7:00 to 8:00 a.m. and 3:00 to 4:00 p.m. peak hours. A large percentage of those employees are involved in shift operations and are therefore not able to participate in flexible work hour programs.
- o There are some office employees of manufacturing firms in the Bayfront area that could participate in flexible hour programs. The estimated impact would be limited to approximately a 1% reduction in peak hour traffic.
- o There is a limited potential for reduced peak hour traffic from the promotion of flexible hours in other employment areas of the Region.

Conclusions

The Region should promote the continued use of flexible work hour programs by employers in the Downtown and should encourage employees to participate in programs made available by their employers. This would reduce congestion on the road system into the Downtown and spread the peak demand for transit services. Such a public promotion program was recently carried out by the TTC in Toronto.

5.6 RIDESHARING PROGRAMS

Existing Policies

Ridesharing refers to both car and van pooling. Car pooling involves two or more people sharing a private automobile for the trip to work. Van pooling involves the use of a van provided by the employer or another agency to be used by a number of employees (usually 8 to 12) for the trip to work.

The Hamilton-Wentworth Region has no specific policies regarding the promotion of ridersharing, although the Region has participated with the Province in the promotion of van pooling to area employers. There is currently one employer in the Region that is actively involved in a van pooling program and a number of other employers that are seriously considering such a program.

Criteria

Van pooling programs are most effective when implemented by larger employers (i.e. more than 500 employees). A successful program requires that there be concentrations of employees residing at one point or along a linear path in an area not well served by transit with longer than average trip lengths (in excess of 25 km).

Car pooling requires concentrations of employment opportunities and residential locations and a mechanism to enable potential participants to be matched up. Car pooling should not be promoted in areas well served by transit, as it could be in direct competition with transit use.

Both car and van pooling programs require that participants have similar working hours with little variation in start and finish times.

Survey Results

The results of the Employee Travel Survey indicate that:

- o Downtown Hamilton and the Hamilton Bayfront are the major employment areas, where there are concentrations of employers with over 500 employees.
- o Approximately 20% of employees who work in Downtown Hamilton live further than 25 km away. Over half of those reside in the Burlington area, which is serviced by transit connections to Downtown Hamilton.
- o Downtown Hamilton is well serviced by transit with approximately 26% of employees using transit to get to work. Any promotion of car and van pooling in this area could have some negative impact on the rate of transit use.
- o Approximately 15% of the employees in the Bayfront Industrial area live further than 25 km from work, with no direct transit connections to serve them.
- o Car occupancy or the percent of auto passengers in the Bayfront area is lower than the Regional average.

Conclusions

There is a small potential to reduce traffic congestion into the Bayfront area through the promotion and implementation of car and van pooling programs to a majority of employers. Large industrial companies outside the Bayfront area could also benefit through the implementation of car and van pooling programs.

Promotion of car and van pooling programs must be closely coordinated with transit service improvements to ensure they do not compete. Any centralized car pool matching program would potentially compete with transit and should only be considered as an alternative to providing transit service.

5.7 BICYCLE PATH SYSTEMS

Existing Policies

There is currently one designated bicycle path in the Region, on Cootes Drive between McMaster University and Dundas. The Hamilton-Wentworth Official Plan states that the acquisition of rights-of-way and design of arterial roads should take into account the demands for bicycle use and allow for the construction of bicycle paths where warranted and feasible.

Criteria

Bicycle paths can be constructed either within existing road allowances, beside road allowances or on separate rights-of-way. Trips made by bicycle may be of a recreational nature, or for travel to work or school purposes and are relatively short in length.

The information from the Employee Travel Survey is used to analyze the potential of bicycle use for work trips only and does not address bicycle use for other purposes.

Survey Results

The results of the Employee Travel Survey indicate that:

- o The average trip length for all employees is 23 minutes or approximately 10 km.
- o Approximately 15% of employees have trip lengths under 3 km which is suggested as a reasonable maximum trip length for bicycle trips to work. Of these employees, approximately 6% walk to work and less than 0.5% use bicycles.
- o The average work trip length to the Bayfront Industrial Area is slightly longer than the Regional average and there are fewer trips of under 3 km.
- o The average work trip length to Downtown Hamilton is similar to the Regional average and there are many more shorter trips of under 3 km.

Conclusions

According to the survey information, a system of bicycle paths could not be justified on the basis of serving work trips only. However, any system of bicycle paths established to serve the demands for recreational and school travel should take into consideration potential travel to work by bicycle. If a system were to be established, connections should be provided specifically to the Downtown Hamilton area, the major shopping centres and institutions such as educational establishments.

5.8 ROAD SYSTEM IMPROVEMENTS

Existing Policies

The Hamilton-Wentworth Region is responsible for the construction, operation and maintenance of the arterial road system in the Region. It also provides input to the Province concerning the expansion of the Provincial road system in the vicinity of the Region. The Hamilton-Wentworth Official Plan contains policies outlining planned improvements to the road systems including:

- o Improvements to Burlington Street East;
- o The construction of a new east-west roadway across the mountain connecting to a new north-south roadway in the vicinity of the Red Hill Creek Valley connecting to the QEW in the south;
- o The construction of the Perimeter Industrial Road connecting Burlington Street west to Highway 403;
- o Expansion of the QEW Skyway; and
- o Extension of Highway 403 west to Brantford.

At the present time, the new Burlington Street East improvements are nearing completion, the QEW improvements are under construction, and the plans for the East-West and North-South roadway have been submitted to the Ministry of the Environment for review.

Survey Results

The results of the Employee Travel Survey indicate that:

- o A large proportion of the work force (12%) live in Burlington and areas further east and must commute either the QEW or Highway 403 corridors;
- o Approximately 30% of employees in the Bayfront Industrial area live on the Hamilton Mountain and must commute across the Niagara Escarpment. These commuters would be well served by the proposed East-West and North-South Roadway. An additional 33% of employees live in eastern Hamilton and Stoney Creek and could also make use of the proposed facility;
- o 24% of employees in Downtown Hamilton live outside of Hamilton-Wentworth and could make use of the proposed Perimeter Industrial Road to gain direct access to Highway 403. This road could also be used by the 20% of employees in the Bayfront area who live in central and west Hamilton, Dundas and Ancaster; and

- o Based on the observed commuter patterns in industrial areas, the new industrial area on the Hamilton Mountain will need the high quality road access provided by the proposed East-West and North-South Roadway to accommodate work trips to the area, as well as material shipments in and out of the area.

Conclusions

The planned expansion of the road system including the specific improvements discussed, is compatible with the observed demand for work trips travel.

The data from the survey can be used as input to the assessment of other minor improvements to the road system.

5.9 FURTHER APPLICATIONS OF SURVEY DATA

The information obtained through the Employee Travel Survey will also be used to assess the impact of proposed changes in the transportation system and to better understand the potential changes in travel patterns as future development occurs. These further analyses will be achieved through refining the Region's travel forecast model to better simulate the travel characteristics of employees as measured by the survey. The updated model can then be used to assess potential changes in travel patterns in response to proposed changes in the road and transit systems and can assess those changes that will be necessary in the transportation systems to accommodate future development.

APPENDIX A

CELL DEFINITIONS

APPENDIX ACELL DEFINITIONS

As described in Section 2.1, the survey sample involved the identification of subgroups or cells, based on all combinations of the following categories:

1. Firm Size - Number of employees in firm

Size Code	1.	1 - 19 employees	
	2.	20 - 99	"
	3.	100 - 299	"
	4.	300 - 499	"
	5.	500+	"

2. Firm Type - Activity that firm is engaged in

Type Code	1.	Manufacturing, Construction & Wholesale
	2.	Retail
	3.	Service

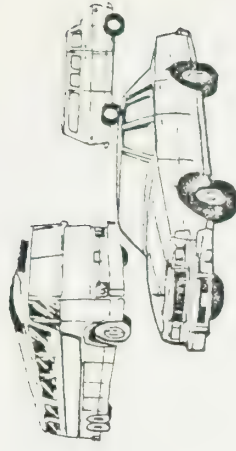
3. Macro Zone - Geographic Zone

- see zone map, Exhibit 2.1
- for large firms, (20 or more employees), 11 macro zones sampled as illustrated in Exhibit 2.1
- for small firms, (19 or fewer employees), sample selected from all 30 macro zones

APPENDIX B

SURVEY QUESTIONNAIRE

COMMENTS AND SUGGESTIONS



HAMILTON-WENTWORTH EMPLOYEE TRAVEL SURVEY

Each weekday thousands of people travel by private vehicle or transit to and from work in the Region of Hamilton-Wentworth. This travel often results in the traffic congestion that delays our travel.

In order to improve upon the transportation system in Hamilton-Wentworth, we need to base up-to-date information on where people live and work, by what means they travel to work, and why they choose that particular method of transportation.

You and your fellow employees are being asked to help by answering the questions on this form. It will take only a few minutes of your time. For transportation planning to be successful, we need to know the address where your work trip starts, however. Your name or signature are not required. The information you give will be kept in confidence and will not be passed to any business or company other than the Regional Planning Department.

If you would like to make any comments or suggestions, you may use the space on the back of this form. Hamilton-Wentworth, please use the space on the back of this form.

Finally, we would like to thank you in advance for your co-operation in this important survey.

Thank you for taking the time to fill out this form, it is greatly appreciated. If you have any questions about the survey, please contact the Regional Planning and Development Department by telephoning 526-4156 during business hours.

D.A. Lynch
Commissioner
Planning and Development

Please give your home address (where your trip to work normally starts). This information will be treated as confidential.

STREET ADDRESS _____
CITY OR TOWN _____

PLEASE ANSWER QUESTIONS 2 TO 9 FOR YOUR LAST COMPLETE WORKDAY OR SHIFT

Q 2 When did you arrive at work on your last workday or shift?

ARRIVED AT _____ A/M P/M DAY _____ A/M P/M
WHEN DID YOU LEAVE? _____ A/M P/M

Q 3 How long did it take to travel to and from work?

HOME TO WORK _____ MINUTES, WORK TO HOME _____ MINUTES

Q 4 How long did you travel to and from work? Please check the appropriate means.

If you used more than one means of travel, please number each in the order you took them

	HOME TO WORK	WORK TO HOME
DRIVER OF CAR, TRUCK OR VAN	_____	_____
PASSENGER IN CAR, TRUCK OR VAN	_____	_____
HSR BUS	_____	_____
GO BUS	_____	_____
CANADA COACH	_____	_____
WALKED ALL THE WAY	_____	_____
OTHER (Please describe)	_____	_____

Q 5 If you drove a car or other vehicle to and from work, please indicate the major reasons. Please circle most appropriate NUMBERS

- 1 NEED CAR BECAUSE OF PHYSICAL DISABILITY OR HEALTH PROBLEM
- 2 DROPPED OFF SPOUSE OR CHILD AT WORK OR SCHOOL
- 3 NEEDED CAR TO TRANSPORT GOODS OR EQUIPMENT AS PART OF MY JOB
- 4 NEEDED CAR FOR TRIPS RELATED TO MY JOB DURING THE DAY
- 5 TRANSPORTED OTHER PEOPLE IN A CAR OR VAN POOL
- 6 NEEDED CAR FOR SHOPPING OR PERSONAL BUSINESS TRIPS DURING OR AFTER WORK
- 7 CAR IS THE ONLY AVAILABLE MEANS OF TRANSPORTATION BETWEEN MY HOME AND WORK
- 8 CAR IS MORE CONVENIENT, COMFORTABLE OR PRIVATE THAN TRANSIT
- 9 CAR IS FASTER THAN TRANSIT
- 10 OTHER (Please explain) _____

Q 6 How many vehicles (cars, trucks, vans) are available to the occupants of your household

_____ OWNED VEHICLES
_____ LEASED VEHICLES

Q 7 If you drove a car or other vehicle to work when did you park (circle most appropriate NUMBER)

- 1 ON STREET (FREE)
- 2 ON STREET (METER)
- 3 IN PARKING LOT OR GARAGE (FREE)
- 4 IN PARKING LOT OR GARAGE (PAID)

Q 8 If you were a passenger in a vehicle or used transit for any part of your trip to work, please indicate the major reasons why. Please circle appropriate NUMBERS

- 1 DO NOT OWN A CAR
- 2 DO NOT HAVE A DRIVER'S LICENSE
- 3 OWN CAR BUT IT WAS NOT AVAILABLE
- 4 USE A CAR OR VAN POOL (SHARE COSTS WITH OTHER DRIVERS)
- 5 GET A FREE RIDE TO WORK
- 6 TRANSIT IS CONVENIENT TO HOME AND/OR WORK PLACE
- 7 TRANSIT IS LESS EXPENSIVE THAN CAR
- 8 OTHER (Please explain) _____

Q 9 Regardless of how you actually travel, how many minutes does it take to walk from your home to the nearest public transit service that you can take to work?

_____ MINUTES

TRAVEL IS INFLUENCED BY PERSONAL CHARACTERISTICS. THEREFORE WE WOULD LIKE TO ASK YOU TWO QUESTIONS ABOUT YOURSELF TO GIVE US A BETTER UNDERSTANDING OF WORK TRAVEL

Q 10 Your sex (Please circle) 1 MALE 2 FEMALE

Q 11 Please indicate your occupation from the list of categories below. If you are not sure where to place your occupation, circle number 9 (OTHER) and give the title of your job and describe your job duties

- 1 CLERICAL AND GENERAL OFFICE WORK (Secretary, Bookkeeper, Teller, Mail Carrier)
- 2 SALES OCCUPATION (Sales of goods or services e.g. Cars, Insurance)
- 3 SERVICE OCCUPATION (Shoe Repair, Waiter, Police, Handresser, Maintenance Personnel)
- 4 CONSTRUCTION (Labourer, Foreman, Electrician)
- 5 PRODUCTION OCCUPATION (Steel Worker, Warehouseman, Assembly Line Worker, Machinist)
- 6 TRANSPORTATION (Bus/Truck Driver, Pilot, Train Crew)
- 7 PROFESSIONAL AND TECHNICAL (Engineer, Nurse, Teacher, Social Worker, Artist)
- 8 EXECUTIVE AND MANAGERIAL (Business Manager, Vice President, Personnel Manager)
- 9 OTHER (Please describe) _____

APPENDIX C

EMPLOYEE DATA BANK

DETAILS OF CONTENTS AND

CODES

APPENDIX CEMPLOYEE DATA BANK DETAILS OF CONTENTS & CODES

<u>FIELD NO</u>	<u>CONTENTS AND CODES</u>	<u>COLUMN NO</u>
1	Employer Number Macro zone number plus sequential number See Volume 1 report, Appendices A5 & A6	1-4
2	Employer Micro Zone - zone number from 1 to 135 (within Hamilton-Wentworth See attached micro zone map	5.8
3	Work Arrival Time - 24 hour clock - 1011 to 2459 (1:00 a.m. to 12.59 p.m.)	9-12
4	A.M. or P.M. for Work Arrival Time Code 1 - A.M. 2 - P.M.	13
5	Day of Week for Work Arrival Time Code 1 - Monday 2 - Tuesday 3 - Wednesday 4 - Thursday 5 - Friday 6 - Saturday 7 - Sunday	14
6	Work Departure Time - See Field 3	15-18
7	A.M. or P.M. for Work Departure Time - See Field 4	19
8	Trip Time to Work - travel time in minutes - 1 to 999	20-22
9	Trip Time From Work - See Field 8	23-25
10	Travel Mode to Work* (First Field) Code 1 - Driver of car, truck or van 2 - Passenger in car, truck or van 3 - HSR bus 4 - GO bus 5 - Canada Coach 6 - Walked all the way 7 - Other (description requested)	26

*Note: Multiple responses to this question were recorded in separate fields.

11 & 12	Travel Mode to work* (2nd and 3rd Fields) - See Field 10 for codes	27 & 28
13, 14 & 15	Travel Mode from Work* (1st, 2nd and 3rd Fields) - See Field 10 for codes	29, 30 & 31
16, 17 18 & 19	Reason for Driver Mode* (1st to 4th Fields) Code 1 - Needed car because of physical disability or health problem 2 - Dropped off spouse or child at work or school 3 - Needed car to transport goods or equipment as part of my job 4 - Needed car for trips related to my job during the day 5 - Transported other people in a car or van pool 6 - Needed car for shopping or personal business trips during or after work 7 - Car is the only available means of transportation between my home and work 8 - Car is more convenient, comfortable or private than transit 9 - Car is faster than transit 10 - Other (explanation requested)	32, 33 34 & 35
20	Number of Owned Vehicles - No vehicles (cars, trucks, vans) available Occupants of employees' household (0-9)	36
21	Number of Leased Vehicles - See Field 20	37
22	Type of Parking (used by drivers) Code 1 - On street (free) 2 - On street (meter) 3 - In parking lot or garage (free) 4 - In parking lot or garage (paid)	38
23, 24	Reason for Non-Driver Mode (1st to 3rd Fields) (for passengers in vehicles or transit users) Code 1 - Do not own a car 2 - Do not have a driver's licence 3 - Own car but it was not available 4 - Use a car or van pool (share costs with other drivers) 5 - Get a free ride to work 6 - Transit is convenient to home and/or work place 7 - Transit is less expensive than car 8 - Other (explanation requested)	39, 40 & 41

26	Walk Time to Transit Service - From home, to nearest public transit service available for travel to work (0-999 minutes)	42-44
27	Employee Sex Code 1 - Male 2 - Female	45
28	Occupation Code 1 - Clerical and general office work (secretary, bookkeeper, teller, mail carrier) 2 - Sales occupation (sales of goods or services e.g. cars, insurance) 3 - Service occupation (shoe repair, waiter, police, hairdresser, maintenance personnel) 4 - Construction (labourer, foreman, electrician) 5 - Production occupation (steel worker, warehouse man, assembly line worker, machinist) 6 - Transportation (buss/truck driver, pilot, train cres) 7 - Professional and technical (engineer, nurse, teacher, social worker, artist) 8 - Executive and managerial (business manager, vice president, personnel manager) 9 - Other (description requested)	46
29	Employer Size Code - number of employees in firm Code 1 - 1 - 19 employees 2 - 20 - 99 " 3 - 100 - 299 " 4 - 300 - 499 " 5 - 500 "	47
30	Employee Type Code - activity of firm Code 1 - Manufacturing, construction & wholesale 2 - Retail 3 - Service	48
31	Employer/Work Micro Zone - See Field 2	49-51
32	Employee/Home Macro Zone - Macro zone number (1-38), see attached map	52-53
33	Employer/Work Macro Zone - see Field 31	54-55
34	Travel Mode (special) Code 1 - Drive 2 - Non-drive 3 - Combination of drive & non-drive	56-57
35	Total Employees in Firm	58-62

36	Sampled Employees in Firm	63-67
37	Cell Number - 4 digit code, including Digit 1 & 2 - Work macro zone (from Field 31) 3 - Employer Size Code (from Field 29) 4 - Employer Size Code (from Field 30)	68-71
38	Total Employers in Cell	72-75
39	Sampled Employers in Cell	76-77
40	Firm Factor -Field 35 divided by Field 36	78-83
41	Cell Factor -Field 38 divided by Field 39	84-89
42	Occupational Distribution Factor -Adjustment factor to reflect correct percentage of employees by occupation category, by firm	90-95
43	Non-Sampled Cell Factor -Adjustment factor for total macro zones to reflect size/type combinations not sampled	96-101
44	Firm Factor X Cell Factor	102-107
45	Occupation Distribution Factor X Non-Sampled Cell Factor	108-113
46	Firm X Cell X Occupation Distribution X Non- Sampled Cell Factor -One decimal point included	114-119
47	P.M. Peak Period Flag -for work depart times between 4:30-5:30 p.m. plus employees en route during this time Code 0 - not a p.m. peak period trip 1 - p.m. peak period trip	120
48	Firm X Cell X Occupation Distribution X Non- Sampled Cell Factor -similar to Field 46, no decimal point included	121-126
49	Total Factor - Small Firms -for small firms only (Cell X Non-sampled Cell Factors)	127-132
50	Regional Factor -adjustment for macro zones not sampled	133-138
51	Total Factor - Large Firms -Field 46 X Regional Factor	139-144

A P P E N D I X D

O R I G I N - D E S T I N A T I O N T A B L E S

1. TOTAL PERSONS (24 HOUR)
2. TRANSIT PERSONS (24 HOUR)
3. % MODAL SPLIT (24 HOUR)

1. <u>TOTAL PERSONS (24 HOUR)</u>								
<u>HOME ZONE</u>		<u>WORK ZONE</u>						
Home Zone		7-8	10	14	18	20	21-22	25,26,30
Flamborough	1-5	742	4	12	1,143	1,727	1,728	238
Dundas & Anc.	6-9	1,436	43	54	2,153	3,059	2,350	1,441
Glanbrook	10-11	19	49	13	306	1,312	1,118	404
Stoney Creek	12-15	36	13	360	1,138	5,065	2,505	1,157
West Hamilton	16-17	234	2	19	2,823	3,315	1,655	1,350
Downtown	18	104	10	19	3,562	2,049	3,083	1,131
Bayfront	19,20,24	9	2	8	455	1,567	902	69
Cent. & E. Ham.	21-23	170	9	243	5,219	15,088	10,674	1,188
Mountain	25-30	311	41	105	9,969	17,398	12,891	11,178
External Zones	31-38	412	104	468	8,318	8,944	7,151	1,572
TOTAL		3,473	277	1,301	35,086	59,524	44,057	19,728
2. <u>TRANSIT PERSONS (24 HOUR)</u>								
Flamborough	1-5	0			14	3	11	9
Dundas & Anc.	6-9	12			229	38	63	4
Glanbrook	10-11				5	3	9	2
Stoney Creek	12-15			5	245	141	132	52
West Hamilton	16-17	27			965	390	245	312
Downtown	18	19			309	351	476	152
Bayfront	19,20,24				217	196	127	3
Cent. & E. Ham.	21-23	9		4	2,132	1,725	2,039	134
Mountain	25-30	13	2		4,249	1,635	2,712	1,142
External Zones	31-38				813	47	211	65
TOTAL		80	2	9	9,178	4,529	6,026	1,878
3. <u>3% MODAL SPLIT (24 HOUR)</u>								
Flamborough	1-5							4
Dundas & Anc.	6-9	1			11	1	3	
Glanbrook	10-11				2		1	
Stoney Creek	12-15			1	21	3	5	4
West Hamilton	16-17	11			34	12	15	23
Downtown	18	18			9	17	15	13
Bayfront	19,20,24				48	12	14	4
Cent. & E. Ham.	21-23	5		2	41	11	19	11
Mountain	25-30	4	5		43	9	21	10
External Zones	31-38				10		3	4
TOTAL		2	1	1	26	8	14	9

HAMILTON PUBLIC LIBRARY



3 2022 21292797 0

